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CACTUS AND SUCCULENT JOURNAL

Of the Cactus And Succulent Society Of America

Vol. XXIII SEPT.-OCT., 1951 No. 5

FIG. 82. Harry Johnson, Sr.
Johnson Cactus Gardens

CACTUS AND SUCCULENT JOURNAL

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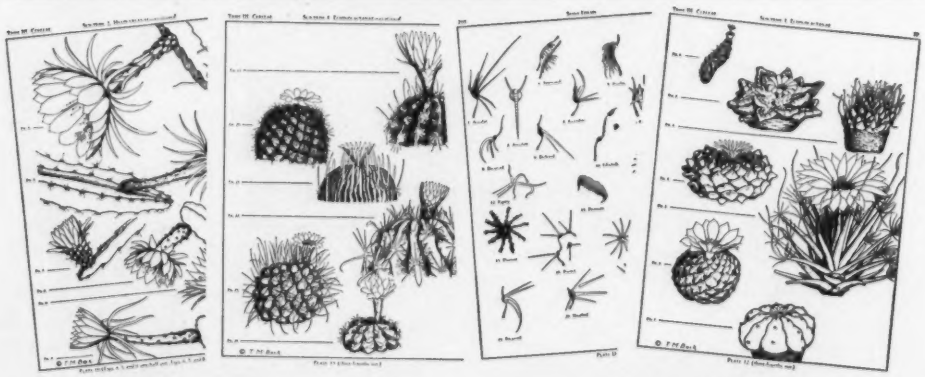
NOMINATION OF OFFICERS FOR 1952

A Nominating Committee consisting of Mrs. Florence Cariss, Dr. Yale Dawson, Mr. Homer Rush, Bob Kilian, and Mr. Haselton selected unanimously the following officers to best serve the Society for this next year: *President:* Harry Johnson, Jr., *Vice-President:* Bob Kilian of Gates Famous Gardens, *Secretary:* Mrs. Ethel Rush, *Treasurer:* G. G. Glade. *Board of Directors:* Dr. Lyman Benson of Pomona College, Gilbert Tegelberg, who was one of the first members of the Society, and Dr. Elzada Clover of University of Michigan to represent the East. For Democracy's sake there may be nominations from the floor. When you get your ballot by mail, be sure to vote promptly.

EPIPHYLLUM NOTES

The interests of the Epiphyllum Society of America was upheld at the recent Cactus and Succulent Society at Denver, Colorado, by the showing of numerous Kodachrome slides of the colorful Epiphyllum hybrids which were loaned for the event by Sherman E. Beahm of the Beahm Gardens. Two years from now, since the next convention will be held in the Los Angeles region, it is to be hoped that these flowers may be shown in reality as well as by slides. It will be a little late in the season as they are at their prime in May, but maybe by a little judicious planning some can be induced to flower late.



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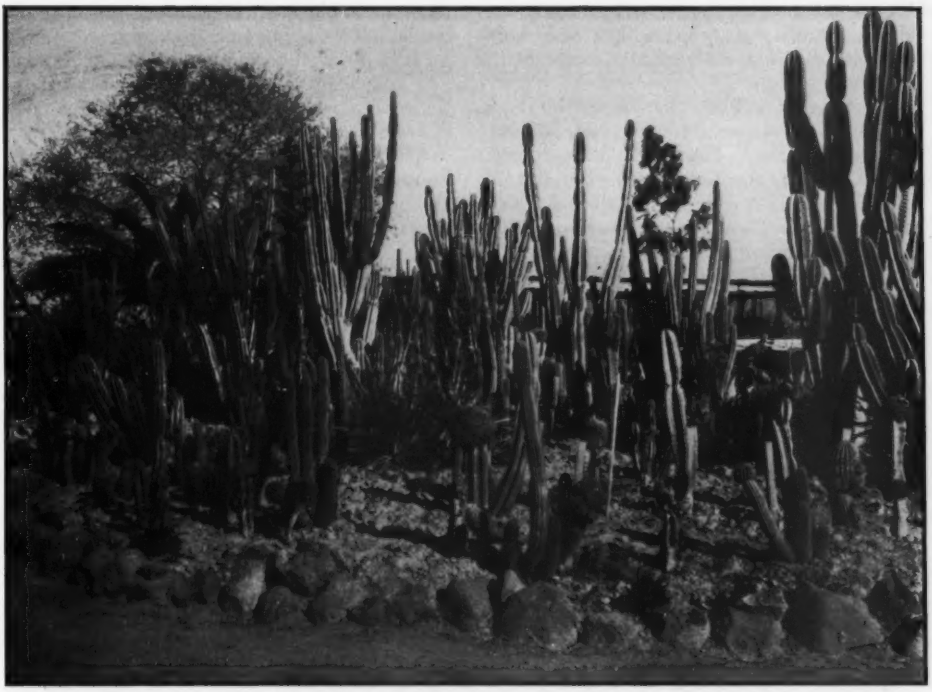


FIG. 83. Part of the display garden of mature cacti for the education of visitors.

CACTI BY THE MILLIONS

By SCOTT E. HASELTON

The Johnson Cactus Gardens have the distinction of being the oldest and best known retailers of cacti and succulents in the U. S. Their specialization, consistent publicity and pleased customers have contributed to the building of this large institution. The Nurseries were started in Bordentown, New Jersey, in 1876. In 1894 they were removed to Hollywood, California, and in 1921 they moved to the present site in Paramount, California. Three generations of family experience in growing and shipping plants is being celebrated this year, their seventy-fifth year of service.

Harry Johnson is well equipped to head these Gardens having studied under the leading botanists of the country. He has known most of them personally, including Dr. J. N. Rose and other specialists in cacti. As a very young man he was in charge of the growing houses of the Conservatories at Lincoln Park, Los Angeles, and later initiated the plantings at the lovely Fern Dell at Griffith Park. In Washington, D. C., in the Office of Foreign Seed and Plant Introduction under Dr. David Fairchild he saw to the distribution of new plants to experimenters. Later in Central America he was manager of a coffee finca also collecting herbarium material distributed by Dr. Maxon of the National Herbarium. In Los Angeles again he taught Horticulture for several years while removing the nurseries to Paramount and reorganizing the business. The next twenty years were devoted to building up collections and popularizing Cacti and their other specialty Water Lilies with many field trips in the west and as far south as Ecuador and Peru.

His connection with the Department of Agriculture and missions in Central America gave him the opportunity to know tropical plants first hand. Then his travels in South America and the American deserts have given him the opportunity of collecting and introducing many cacti

that are unknown to science. His scientific interests and studies, combined with a wide horticultural experience, have made him one of the best growers of the age.

A business is no better than those who run it. We can say this as we introduce Harry Johnson, Jr., who was born in Guatemala and we predict he will maintain the success of the business this next generation. A college graduate and veteran of World War II, he is assuming his share of the business management. "Hal," as we call him, is president of the Cactus and Succulent Society of America and is nominated for re-election. Both Hal and Harry Johnson, Sr., are generous with their busy hours as they contribute generously to the promotion of interest in cacti and succulents.

Mrs. Johnson, throughout the years, has been in charge of the office staff and her pleasing personality has always been one of the greatest assets of the Nursery. She is a great traveler and is now preparing to return to Guatemala for a visit. A younger son, Ethan, is doing his stretch in the U. S. Air Force before he returns to his place in the Johnson enterprise.

The Johnsons have spent more money in advertising and publicizing cacti than all the other dealers combined. It is not surprising that the public is demanding from Mr. Johnson a popular book on cacti containing his experiences and vast knowledge about these exotic plants (hundreds of pictures have been taken and the book is to be a reality).

The Johnson Gardens cover ten acres of glasshouses, covered frames, growing yards, and shipping equipment. It is their policy to grow healthy plants with emphasis on those that will flower at a maturity of three or four years from seed. Some plants are grown from cuttings and offsets but the bulk of the plants are grown from healthy seed. The seeds are started in rooms of high humidity. After the small cacti have been transplanted twice, they are large enough to benefit by more light and air and are moved from the greenhouses to raised, glass-covered frames. Here they luxuriate in the heat, intense light and free ventilation. This induces a vigorous root growth and early flowering maturity. In the summer and most of the winter days these young plants can be hardened off by removing the glass and leaving them under the lath frames so they will be stronger plants for shipping and easier to reestablish after shipment.

Two news items will interest our members.

FIG. 84. A section of the cold frames and growing yards where close to two million cacti are grown.

The Johnson Cactus Gardens, Paramount, California, have published a 48-page "Diamond Jubilee Handbook" for 1951. It is filled with pictures, cultural instructions, and information about the plants. This book also is a catalog of collector's items as well as plants for the beginner. The book is sold for 50c postpaid. The other news item is that Harry Johnson, Sr., is leaving this September for another three-months collecting trip in South America. We look forward to the many new plants that he is sure to find and anxiously wait to hear of his experiences in this land of cacti.

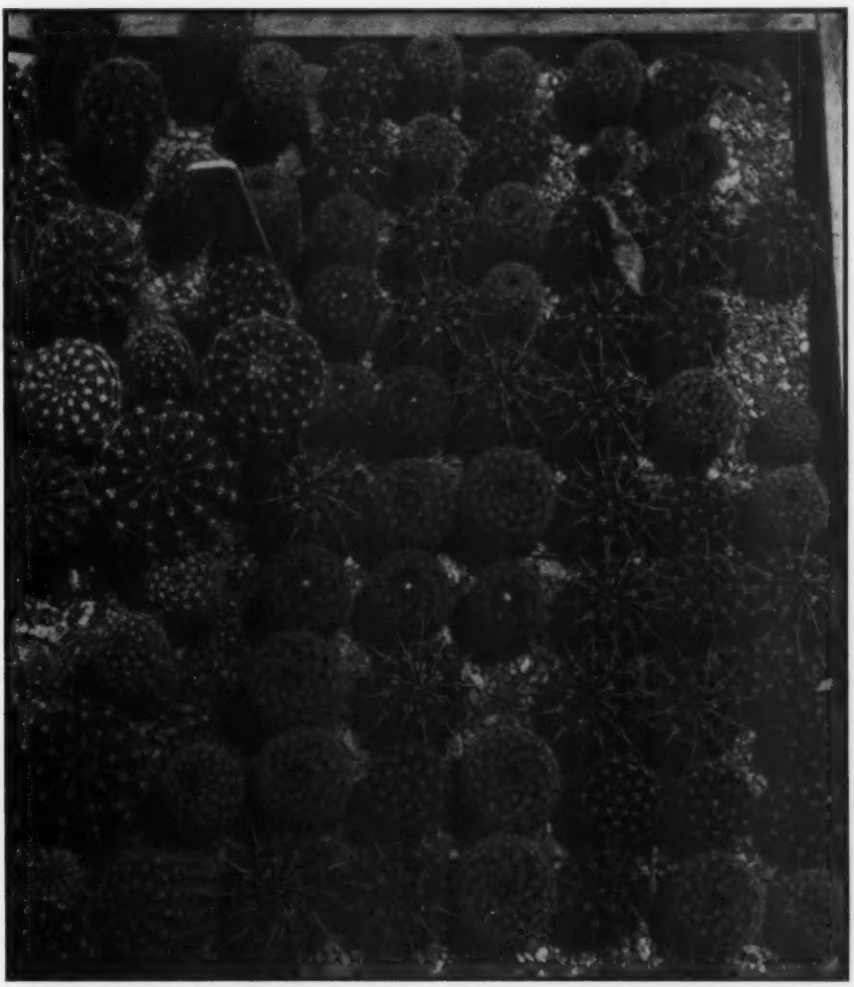


FIG. 85. This interesting observation was made at the Johnson Cactus Gardens. The picture shows, at right of label, the variations of plants grown from one seed pod of Notocactus. This proves that in their younger stages at least many species are variable. The finer spined plants eventually assume the heavy spined appearance and cannot then be distinguished apart. Many Notocacti near *M. mammulosus* behave similarly as does *Malacocarpus*. The juvenile characteristics, not seen in mature plants, are often a clue to the relaionship and evolution of cacti.

FIG. 86. A flat of Rebutias grown from seed. One of these plants of many variations, was selected as a type species by a European botanist. This is a dangerous procedure.

TO WATER OR NOT TO WATER

As Mr. Harry Johnson, Sr., has said in one of his Question and Answer pages in the JOURNAL, to say "moderate watering," "generous treatment," and the like to a rank amateur like myself means nothing, as one must first have a point of reference, namely one's personal experience. I can, however, understand the necessity for various writers' vagueness, as conditions vary and all factors cannot be known by the writers.

Since my interest in Cacti and Succulents began (just a few months ago), I have been devouring all the amateur class descriptive and cultural books I have been able to obtain and absorbing the contents as rapidly as limited time permits. Since *all* the cactus books emphasize "Don't over-water"—"Over-watering causes rot"—"More collections have been ruined by over-watering than any other single factor," etc.—I had been treating my now nearly 150 plants accordingly.

As my husband and I have visited several cactus gardens and private hobby collections, however, I have gradually begun to wonder if perhaps I might be keeping my plants too dry.

I wish to report the results of my experiments here for the benefit of other very amateurish-amateurs like myself who might also be having difficulty establishing that all-important Point of Reference.

I set my eye-dropper aside, and began to pour on the water, while my husband alternately held his breath, shook his head sadly, and gently warned me of the dire consequences to expect.

In just two short weeks since I began giving my cacti and succulents more water, *all* the plants have lost their shriveled appearance, have gotten quite plump and juicy-looking, and new growth is in evidence *everywhere*, throughout my collection both indoors and in my outdoor garden.

Perhaps this is too early to report, as I still might experience the dire consequences my husband has predicted, but it seems to me that all this new growth (which he views with his tongue in his cheek and with one raised eyebrow) is, if not "proof," at least "encouragement."

Perhaps there are other beginners like myself who might be taking the warnings of the books too literally and are being too "stingy" with the water, at least during the growing period, here in California.

I am just reaching the point, in my study of Cacti and other Succulents, where I am reminded sharply once again: "The more you know, the more you know how little you know."

MRS. W. FRED MAYALL.

FAMILIES of DICOTYLEDONS

By ALFRED GUNDERSEN

Curator, Emeritus, Brooklyn Botanic Garden

This well illustrated account on the classification of the dicotyledons, the first original publication covering the subject since Rendle's and Hutchinson's books of 1925 and 1926, has just been issued as Volume 25 of "A New Series of Plant Science Books," edited by Frans Verdoorn.

There are introductory chapters by Arnold (Fossil Dicotyledons), Tippo (Wood Anatomy), Just (Carpels and Ovules), Copeland (Embryology), Taylor (Cytotaxonomy), and Camp (Plant Geography).

The special, concise scheme which the author followed in describing the families of dicotyledons, enabled him to present more information than one would expect in such a relatively small and inexpensive book. There are 240 pages, profusely illustrated with drawings by Maud H. Purdy. Like all of the Chronica Botanica books, it is well indexed. Cloth bound $4.75.

Waltham, Mass.: The Chronica Botanica Co.;
San Francisco, Calif.: J. W. Stacey, Inc.

FIG. 87. *Agave nizandensis* sp. nov. plant and flower.

A New Dwarf Mexican Agave

By LADISLAUS CUTAK

Horticulturist, Missouri Botanical Garden

As we neared Nizanda, Tom MacDougall stopped short and pointing to a high acclivity, said: "Lad, up there on that steep slope you will find one of the greatest concentrations of desert plants in this region. You're going to forget all the inconveniences we have experienced so far and revel in a plantsman's paradise."

How true his words turned out to be! On a two-day train and hike excursion in February, 1947, we encountered enough adventure to write a book. On this particular occasion Tom MacDougall wanted me to meet an old friend of his—Henry Knape, who dairy-farmed in the Mixe Indian country of Oaxaca. The train ride from Tehuantepec to Mogoñe consumed a half-day and was uneventful, but from then on proved quite exciting. We found Mr. Knape in bed with malaria. After an all-too-short visit, we bade him farewell and started on a walking expedition to Matias Romero in order to explore the wild, highly-scenic Malatengo Gorge. There we hoped to catch a train for Chivela in the early morning hours and then hike to Nizanda, where an interesting natural rock garden existed.

We arrived in Matias Romero around eight o'clock in the evening wet from rain that had fallen intermittently during the afternoon. The town was celebrating some feastday and all available lodging places were taken long before our arrival. By ruse, MacDougall obtained a room in the station hotel but we had to sleep on the bare cement floor with no covering except sheets of old newspaper. About one-thirty in the morning we were rudely awakened by an inebriated room clerk and rather than get into trouble gave up our room. Shortly after we boarded the train for Chivela where we arrived an hour later. In the blackness of night we huddled beside a station platform until dawn

arrived and with it sun to warm our cold-numbed bodies.

Between Chivela and Nizanda we enocuntered the curious rock-clinging *Deamia testudo,* whose dark green stems resembled so many motionless lizards. The olive green joints fasten themselves to the rocks by means of short aerial roots and it is then difficult to dislodge this cactus.

The slopes of Nizanda are often very steep with loose rock everywhere. One has to watch his step so that he doesn't fall into pits. Debris-littered holes are often cleverly concealed by twigs, branches and other dried plant material. A careless step could result in a sprained ankle, broken leg or some other bodily injury.

At Nizanda a great assortment of plants live in comparative harmony—the most conspicuous being members of the Cactaceae, Bromeliaceae, Amaryllidaceae, Araceae, Liliaceae, and Orchidaceae. At the base of lichen-covered rocks we found clusters of pincushion cactus, *Mammillaria elegans,* abloom with a coronet of purple-pink; hanging down from upper pockets were snake-like stems of Selenicereus, and there were two kinds of torch cactus in evidence—a Pachycereus and a new Lemaireocereus. On top of the rocks and in rock fissures grew a green-leaved Agave and another member with soft succulent leaves. Pinned securely to rocks were several species of bromeliads, all belonging to the Tillandsia group. Thickened stems of a dormant aroid climbed up the perpendicular rocks. It emitted a peculiar odor when cuts were made for propagation. A leather-leaved, wavy-margined Anthurium preferred security in the debris of crevices. I had hardly expected to find an orchid among the xerophytes, but there it was—the long thick pseudobulbs of *Cyrtopodium punctatum* arising in clusters on top of the weathered limestone.

At higher levels my attention was focused on wriggling, eel-like flower-spikes arising from large rosettes nestled between boulders. The rosettes were two to three feet across, composed of bright green leaves and black end-spines, while the marginal thorns were tortuous and reddish to black in color. From the center of each rosette there arose a tall bright green stalk, nine feet high, thickly beset with hundreds of small light yellow green flowers. Hardly any of the flowerstalks appeared erect and reminded me of giant worms standing on their heads with wriggling bodies pointed heavenwards.

A second maguey, less spectacular than the above, caught my immediate fancy for it formed dense mats and looked like it might make an excellent pot plant. It was definitely different from all the Agaves of my acquaintance. Some ten leaves appear in a very loose spreading rosette and the lower ones are practically flat against the ground, while the rest are more or less horizontal from an abrupt curve at the base. The leaves are about an inch broad, quite thick, with whitish marginal prickles so closely set that they look like teeth on a fine saw. A broad stripe enhances the middle of each leaf from base to tip and in addition becomes purple tinted when exposed to strong sunlight.

A few small plants were collected and despatched to St. Louis for more careful study. One of the specimens matured recently and began to send out a flower spike on May 24. The stalk grew 2½ inches in a twenty-four hour period for the first three days and then slowed down considerably until it reached its maximum height of three feet ten inches on June 30. Buds began to appear in the latter part of June, the first flowers opening during the week of July 8 and continuing until the last flower on July 30.

A search of herbarium material in the Missouri Botanical Garden disclosed nothing with which it could be matched and when an examination of all available Agave literature showed no close affinity, it was decided to publish it as a new species. The specific name was chosen to denote the type locality of this decidedly distinct and attractive plant. The species belongs in the subgenus *Euagave* but its sectional relationships are not clear. I know the plant from Nizanda only but Tom MacDougall had mentioned previously that he also saw it at two other Oaxacan localities — Santo Domingo Petapa and San Miguel Chimalapa.

Agave nizandensis Cutak, n. sp. Dwarf in stature, stemless, stoloniferous. Leaves 10-15 in a loose rosette, spreading nearly horizontally, the lower ones lying close to the ground, 12-14 inches long, 1-1¼ inches broad at base gradually tapering to a rounded tip terminating in a reddish end-spine not at all pungent, the texture soft and fleshy, the face flat, Elm Green* (dark green) with a lighter broad median stripe, the back rounded, Absinthe Green (pale whitish green) but darker toward margin, the edge furnished with irregular minute deltoid whitish teeth. Peduncle slender, glaucous, 3 feet long, ⅜-¼ inch thick, with numerous erect appressed oblong-lanceolate bract-leaves, the bract-leaves up to 1½ inches long, Absinthe Green, with a membranous margin and terminated by a non-pungent dark reddish spine ⅛ inch long. Flowerspike short, 10 inches long. Flowers 2-4, yellowish-green, situated on short flattened glaucous green branches ½ inch long. Flowers two inches long when including the extended sta-

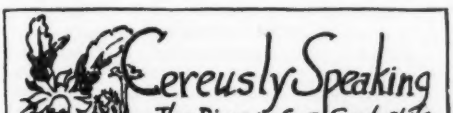
*Color terms used are those of Ridgway's "Color standards and color nomenclature."

mens, tube very short, segments oblongish, obtuse, 3/8 inch long; stamens inserted at base of segments, about 1¼ inches long with grass green anthers attached at the middle and with golden yellow pollen. Ovary somewhat triquetrous.

Type locality: in crevices and pockets of rocks on steep slope, Nizanda, Oaxaca, Mexico, at Km. 233, Tehuantepec National R.R. Plants collected in February, 1947, and flowered at the Missouri Botanical Garden in 1951. Specimen deposited in the Missouri Botanical Garden Herbarium.

Agave nizandensis Cutak, sp. nov.

Planta humilis acaulis stolonifera, foliis circiter 15 laxe rosulatis horizontaliter patentibus lineari-lanceolatis 1.3 cm. crassis 2.5-3 cm. latis 30-35 cm. longis viridibus pallide viridi-vittatis purpurascentibus, spina terminali rubra haud pungente, aculeis marginalibus minutis deltoideis inaequalibus albidis, scapo bracteato gracili glauco 90 cm. longo, bracteis appressis oblongo-lanceolatis pallide viridibus membranaceis 2-3 cm. longis, spica 25.6 cm. longa, floribus 2-4 luteoviridibus e ramulis orientibus, ovario triquetro, tubo 4 mm. longo, segmenti oblongis obtusis 1.5 cm. longis, staminibus basi loborum insertis, antheris medifixis, stylo stamina superante, stigmate capitato trilobato.



Vacation time is over and thoughts of fall and winter are here. Spring growth and summer slumps have been discussed, now it is fall budding and flowering of several species from the mountains at the equator and south temperate zones, the beginning of the seed harvest and the rest period with the problems of winter storage that occupy my attention. Natures cycle of growth, flowering, seed production and dormancy is almost complete.

The height of the blooming season for me is April through June which corresponds to our spring. This season includes South American, Mexican, Southwestern United States types of cacti as well as some African succulents. The Euphorbias, Lithops, Haworthias, Crassulas, and other African succulents usually start flowering in late June and finish by late October. Since the south temperature zone is just beginning spring on September 21st, plants from Australia, South Africa and Southern South America are always a welcome addition to any collection to keep up a succession of flowers after the display period.

At present *Zygocactus truncatus, Rhipsalis houlletiana* and *cassytha* are setting buds while several Lithops, Pachyphytums, Ceropegias, Haworthias, Stapelias, Huernias, and Sedums are in full flower or are just through that period. *Rhipsalis cassytha* has long pendent stems covered with one to three year old crop of white berries. The blooms are small and short lived. However, a well-grown plant will have hundreds of mistletoe-like berries on two to four foot long stems that branch into whip-like branches. Birds like the berries which no doubt supplies the answer to the appearance of *Rhipsalis cassytha* in African forests from Mediterranean garden specimen plants introduced into Europe in 1758 according to Watson.

Rhipsalis houlletiana is an old standby. It buds freely during August and September along the blade-like stems. The bell-like flowers are creamy white and last for two or three days. It has been growing all summer and puts out new stems practically the year around. It has never set fruit for me.

The *Zygocactus truncatus* began resting in August. The new stems have darkened up to match the old. Growth should be encouraged early as buds only appear on mature stems. If the plant is kept resting the buds will mature even though the plant has to be moved before the buds are well set. I have mine in the greenhouse in mid-October where the light is approximately the same intensity and from the same direction as it was in the shade of my grape arbor.

Epiphyllum darrahii, oxypetalum, guatamalense, and *hondurensis* (flower looks the same as *E. guatamalense* but smaller) are putting out their last blooms. These three do best when the days are shortening and cooler. The aromatic fruit of *E. darrahii* which set last October in the greenhouse has ripened—buff-yellow turning brown. I was easily tempted and ate it, since I do not care to raise Epiphyllums from seed. It was a tasteless sub-acid much like the May-apple in taste but as good as any I've tried so far.

Found 3 small seedlings of *Euphorbia bubalina* growing in adjoining pots from last year's seed. The seeds are the size of peas (see The Succulent Euphorbieae of South Africa by White, Dyer and Sloane, Vol. I, pages 252-55). The parent plant blooms from August to October. It is decorative, stays green all winter, and is studded with past years spent bloom stalks. The chartreuse blooms are larger than the average Euphorbia blooms. Book claims it can become a pest in large greenhouses. It pays its way for I've traded several for other Euphorbias. *E. clava* with narrow leaves is another decorative plant (see Vol. I, pages 256-261 of same reference as above) but it does not form seed for me. Both of these plants lose leaves until only a tuft of leaves remains if kept too dry.

Synadenium Grantii (Vol. II, pages 957-960) and *Monadenium Lugardae* (Vol. II, pages 943-946) are arresting specimen plants. Each one has now its new leaves and blooms. The possibility that Euphorbias and sub-species can be used for decoration is just emerging in the modern home decoration magazines.

The Himalayian Euphorbieae in my collection have awakened from their rest period and have their lush green leaves from three inches to eight inches. Some are kite shaped and others are spatulate. Grow well in both orchid and "desert-type" of house.

Examined all of my plants when I cleaned the benches in early September. Always clean out the whole greenhouse and soak-spray with "Black Leaf 40" until the boards have a good nicotine bath. Hampers the free parking of thrip, pill bug, etc., in cracks and surface finish. I am always annoyed at the susceptibility of some plants and pleased by the immunity of others year after year to bugs, fungus and disease.

In my visits to other collections I've found that the owners find the same thing—bugs like Echinopses, Rebutias, Crassulas, Echeverias, Haworthias, Selenicereii, Nyctocereii, Epiphyllums, and Mammillarias, but not all species of the same genus equally. Bugs

do not seem to bother much the Pachyphytums, Pachycereus ,Gymnocalycium, Parodias, Euphorbias, Lithops, Pleiospilos, Gasterias, Huernias, Sedums, Kalanchoes, Kitchingias, and Hylocereii. Sure there are exceptions to both lists and neither one is complete. Again there are certain soils which do not harbor mealy bugs on plant roots while others do. Some plants have mealy bugs on plant body but none on roots while a seemingly-free-of-mealy-bug plant will have bugs on every root and root hair.

Do certain soils contain organisms, such as we are now using on humans, that fight bugs? Or do the plants in these soils have their own protective equipment? I've also found ants do not work in some soils even when there are "root mealies" there. Again I'm at a loss for an answer. Two pots, side by side, same conditions yet one gets the ants while the other does not. This is common in my Haworthia collection where I use the same soil formula. To be sure, I've repotted the whole collection in maple leaf mold, loam, sand and a dash of slaked lime.

When I examined and repotted the Haworthias there was evidence of mealy bugs having been on them but some natural enemy has cleaned them out. The "meal" is there but no eggs, pupae, young or adults. I've tried to find out what destroys them, but there is no other insect (without magnification) than the small white-faced wasp I've mentioned before.

The "pill-bug" population which I fought on my benches last year is gone also. Again what natural enemy has appeared within the year. I've seen "thousand-leggers" and two "cut-worms." No doubt they are carnivorous as I've seen "thousand-leggers" catch and eat flies. The wrens, olive-backed thrush, and robins that have been in might help with some insect life but the "pill-bug" sleeps under things during the day. Mice have been in the greenhouse also. They work at nights. I'm finding less insect life at all events to plague my plants and I'm giving my thanks to my unknown friends.

The storage space is again at a premium. New shelves, grape boxes, and sand filled trays added last year are filled to overflowing now and I've added about 100 rare plants that need light, air, and space. Losses have been few and growth has been much. Most plants are hardened by the cool nights as well as slowed down in growth. This condition can be maintained by leaving the plants outside on a side porch where they will be dry and cool. If placed in a greenhouse the ventilators should be left open and only a light watering given. I watch daily weather maps to find possible harmful changes in the weather. There are few nights when the temperature here goes below 35° until November 15. By then all of my tender plants are safely housed on bench, under bench, on low shelves, on high shelves, cool room on boards, cool room on dirt floor, in cool room on thick layer of sand, in tray surrounded by sand, dirt, etc. My storage spots are planned to get the best results with the least space taken up.

In placing cacti and succulents for storage I make a thorough check of the amount of sunlight available for the time they are to be there in relationship to trees and their growth. A few succulents such as Gasterias, Haworthias, Stapelias, Huernias, etc., can stand less light than others if kept cool and on the dry side. Cacti such as Astrophytums, Echinopses, Pereskias, and Pereskiopsis (defoliate if too dry), columnar cacti, Gymnocalyciums, Epiphyllums, and Opuntias can stand being stored cool and "dry." In an emergency, if not enough space is available in the greenhouse I can place these plants in places with less light and conserve "room." Don't ask what room. I'll find it if it's for cacti.

Most of my plants have their own "niche" to fill year after year where they have performed satisfactorily in the past. They repeat invariably. Euphorbias in good light near the hard coal burner, on a bench; Haworthias, Aloes, Gasterias, and Agaves in cooler parts on shelf, floor and bench; southwestern cacti on high shelves dry and in full light; Selenicereii and Hylocereii vining up strings and wire in good light; Mammillarias, Parodias, Rebutias, Astrophytums, Echinopsis, Ferocacti, Harrisias, etc., on benches where all the winter sunlight they can get reaches them. Epiphyllums (orchid cacti only) in strong light in good airy position; and columnar cacti if kept growing, in full sun.

Many of the best plants I have in my collection have been stored dry with infrequent waterings in cool storage room under shelves, etc., in grape box trays. The best storage depends upon coolness, water, air and healthy plants to begin with. Poor storage methods will eventually injure the best plants. Light and more light, coolness and fresh air will see your plants next spring in good condition.

The winter reactions from storage this fall to the reawakening of my plants next spring will finish the cycle that I began last January. I have written much but many things have been missed. I shall attempt a resume of these things next time.

Thanks for your letters.

JOHN E. C. RODGERS
1229—8th Street, Lorain, Ohio.

FROM INDONESIA

I do not remember whether I informed you that I am now living in Indonesia. I do enjoy the wonderful vegetation here. Some parts of the country are still a little unsafe to visit, but I have made several excursions. The Botanical Gardens at Bogor (formerly Buitenzorg) are most interesting. There is a good succulent collection, although the flowering of certain species is inhibited by the lack of a proper resting season, and perhaps by length of day. One of the botanists there wrote a very good little book on the culture of succulents in the East Indies. I have studied the succulent collections at the botanical gardens at Penang, Singapore and Bogor, about which some interesting remarks could be made. As one would expect, cereus, Euphorbias, Pedilanthus, etc., do well here, but Mamillarias come to grief outside in the rainy season. To my surprise a *Huernia aspera* continued flowering profusely on my front porch throughout the downpours of an exceptionally long wet monsoon. It did not, however, set seed. There are very few native succulents, one of the most interesting ones being *Dischidia rafflesiana* from the tropical forest. I collected it in the wild and was never so covered with ants. Several Hoyas too are native. But apart from the Asclepiads there are few native ones, though several introduced (Opuntias, Epiphyllums, etc.).

J. A. SCHUURMAN
High Commissioner of The Netherlands,
Indonesia.

EDITOR'S NOTE: We look forward to photographs and further comments on collections in the far East.

Arizona Cactuses—Marshall..... 1.00 1.15
Cactus-like Succulents—Lamb..... 1.05
Flowering Plants of Africa, 23 Vols.....$500.00
Abbey Garden Press, 132 W. Union St., Pasadena, Calif.

FIG. 88. Group picture of those who attended the Convention, half of whom were Society members.

REPORT OF THE FOURTH BIENNIAL CONVENTION—CACTUS AND SUCCULENT SOCIETY OF AMERICA, INC.

July 10, 11 and 12, 1951

The fourth biennial convention of the National Cactus and Succulent Society of America was attended by approximately one hundred enthusiastic cactophiles, (67 of whom were registered) in the mile high city of Denver on July 10th, 11th and 12th. Fourteen states of the nation were represented.

All the cactophiles displayed a keen interest in their hobby.

Most of the luncheons and dinners were catered in and this solved the problem of going out in the rain and created a closer fellowship and made for a more enjoyable convention.

There was considerable discussion about the weather, the day before the convention began the thermometer registered 96 degrees. However, on July 10th, the skies were ovrcast, in fact the clouds were so low it rained for three days, and the mercury dropped to fifty-two degrees. Mr. W. Taylor Marshall of Tempe, Arizona, and Mrs. Charles Cole of Cincinnati said they were frozen and it would take three months to get warmed through again.

There were valuable door prizes each day and Muriel Colburn presented an *Echinocereus viridiflorus* to each registered delegate.

The opening session was called to order by Mr. Howard Gates, convention chairman. Mrs. Julia Willis, president of the Denver Cactus and Succulent Society, extended a sincere welcome to all. Mrs. A. H. Risley, member of the Denver Society, accompanied a hillbilly girls' trio, singing a few convention songs, they were: "There are Cactus" (to the tune of Smiles), "The Cactophile Corps" (to the tune of the Army Air Corps) composed by Mrs. Risley. "Just Be a Cactophile" (to the tune of Solomon Levi), "I was Hunting With My Darling" (to the tune of Tennessee Waltz) composed by Mrs. Elizabeth Ekstein.

Mr. Harry Johnson responded by stating "we extend our very warm thanks to the Denver Society for asking us here." Mr. Morton Spielman of Chicago made a motion which was duly seconded and carried that the visiting delegates give a rising vote of thanks to the Denver Society.

A motion was made duly seconded and carried that a letter be written to Mr. E. Shurly of England accepting his good wishes for a successful convention.

Mr. Johnson introduced Mr. A. Millard Armstrong, Vice-Chairman, Motion Picture Division, The Photographic Society of America, gave a talk* on photography. After recess Mr. George Kelley showed kodachrome slides of "Colorado's National Parks" and spoke specifically on conservation of Dinosaur National Park. During the evening session Dr. Elzada U. Clover illustrated her lecture "Cacti of Haiti" with kodachrome pictures. Mr. Fred Gibson, Director of the Boyce Thompson Southwestern Arboretum, entertained the delegates with pictures of the Arboretum.

Wednesday, July 11th, the elected delegates met at 8:00 a.m. for a business session. Mr. Harry Johnson, Jr., presided. The reading of the minutes was dispensed with. The first order of business was the recommendation of a city for the next convention. Delegates from California extended a hearty invitation to hold the 1953 convention in that state. After a general discussion a motion was made duly seconded and carried that the convention be in the hands of the Los Angeles society, the time to be between July 5th and 15th.

At the general session there were round table discussions on various subjects, "Growing Cacti," "Color Photography," "Grafting," "Pest Control," etc. Mr. W. Taylor Marshall led four discussion on "Introduction to Desert Plants." A certificate was presented to all who completed the course. On July 11th and 12th, Sister Marie Fidelis, I.H.M., delivered two wonderful addresses of the convention on chromosomes of cacti.

Wednesday afternoon was free for individual recreation. A goodly number of the delegates drove to the Denver Museum of Natural History. Since it was a rainy and dreary afternoon the museum was a good place to be. The Denver Society held open house from 4 to 6 o'clock p.m. at the home of Mr. and Mrs. Conrad Eckstein for all delegates. Refreshments were served.

*This will appear in a forthcoming JOURNAL.

In the evening the delegates returned to the convention hall for the Reminiscense Hour with kodachromes by Lad Cutak. All the conventioneers enjoyed this even though some of them had never attended a cactus convention before.

Mr. John Leasure entertained with kodachromes also.

Nominations for king were Mr. Gilbert Taylor of Beaver, Oklahoma, and Mr. Frank Muchow of St. Louis. Nominations for queen were Mrs. Patricia Moorten of Palm Springs, California, and Mrs. Hermann of Joliet, Illinois. Mr. Taylor and Mrs. Moorten were elected king and queen to reign over the fun session and initiation.

Mrs. Alvina Pohndorf of Denver made a most interesting and informative talk entitled "Romance in Rocks." $5000.00 of jewelry from Mrs. Pohndorf's private collection was on display. All of which was gem material from Colorado. (Those attending the round table discussion on rocks and minerals received a small bag of rock specimens.)

The last afternoon of the convention was crowded with many activities, due to the inclement weather, the scheduled program was changed so that the crowning of the king and queen and initiation was held in convention hall instead of in the open Park of the Red Rocks.

The final business session heard a report of the delegates regarding the next convention, it was announced that the place would be the Los Angeles vicinity, the time to be set by the executive board. Mr. Howard E. Gates was elected convention chairman; Mr. Ladislaus Cutak, vice-chairman; and Mrs. Cariss, convention secretary.

Before the fun began Mr. M. Walter Pessman, author of "Meet the Natives" made a very informative talk. One of the highlights of the convention was the crowning of the king and queen. The beautiful crowns and septre were prepared from cacti and desert flora by Mrs. Moorten. The fun and initiation session was under the direction of Lad Cutak. The highlight of the afternoon was the cactus hat contest. As previously announced any lady could enter as many hats as she pleased, the only requisite being they must pertain to cacti or succulents. Approximately 25 or 30 hats were entered. Men and boys modelled the hats and they were all excellent actors and good sports. The $25.00 cash prize was won by Miss Joann Varone of Denver, Colorado. The second prize was won by Muriel Colburn of Denver. There were a number of other prizes and honorable mention went to quite a few of the hats. All the hats were excellent. The three impartial judges of the contest were: Mrs. Bernice Lang of Denver a registered flower judge, Mr. Cliff Mann, owner and operator of the Colorado School of Floral Design and Mr. Harry Johnson, Jr., national president.

At the beginning of the initiation Mr. Dale Morgan of the Mutual Broadcasting Company, "Where's Morgan" program interviewed Mr. Howard Gates, Mrs. Elizabeth Eckstein, Mr. Lad Cutak and Mr. John Leasure. The transcription was broadcast Friday night at 9:15 over station KFEL.

The convention was concluded with a buffalo barbeque dinner at the Park of the Red Rocks. After dinner the delegates were favored with kodachromes of "Cactus that bloom in Idaho," by Carl Henscheid. They were very beautiful.

The post convention field trip was taken by quite a number of conventioneers. This was a fitting climax to a most enjoyable convention.

MURIEL COLBURN.

THE VALUE OF PLASTIC POTS

Mention of plastic pots in the Mar-April issue calls to mind a small experiment conducted by our Government Plant Research Dept. at the request of the maker of these pots who is also an enthusiastic member of our cactus society. Some 50 pots, yellow, red, pink, green (2 shades), blue and transparent. The same number of clay pots were also used and placed alternately on the glasshouse bench. Every pot contained exactly the same weight of the same soil mixture.

Into each pot was planted a seedling tomato plant. Accurate records were kept of the quantity of water and number of waterings to each pot. When the plants were well grown they were cut off at ground level and all weighed. The whole experiment was repeated again using cauliflowers.

Results? Growth in the plastic pots was only very slightly better than in clay pots. Water consumed was very much less in plastic and naturally the number of waterings was also less. Whether the same results would be found with cacti remains to be discovered. Two very important points did, however, come to light. Plants simply would not remain happy in blue plastic pots and so this colour is now not being made. The transparent pots did not work out very well either. The roots didn't like the light. But by placing these pots inside clay pots it was possible to study root growth and bugs simply by lifting up the plastic pot. Plants growing in clay pots can be quite easily tipped out but those well established in plastic have a thick film of algae adhering firmly to both the soil and the inner face of the pot. Repotting is not nearly so simple.

A. B. CUTLER,
President, Cactus & Succulent Socy., of N. Z.

* * *

Backeberg Moves to Southern France

Curt Backeberg of Volksdorf, Germany, has accepted the directorship of J. Marnier-Lapostolle's "Marnier Tropical Gardens" in St. Jean Cap-Ferrat between Nice and Monaco. Most of Backeberg's cacti are being moved to the world famous gardens in southern France. A recent report from Germany states that *Stachlige Wildnis** is about ready for delivery (a sample of one of the hundred excellent illustrations has been received).

*Price between four and five dollars for this 400 page book. Order now and an invoice will be sent after delivery. Abbey Garden Press, 132 W. Union Street, Pasadena, California.

The following seven pages are the fifth installment of Backeberg's new genera. The index will complete this valuable contribution.

SOME RESULTS OF TWENTY YEARS OF CACTUS RESEARCH[1]

By CURT BACKEBERG

PART II

V. guentheri (Kupper) Backbg., 1950f, Cact. & Succ. Journ. Am.: 154, by mention as type of genus but without actual combination.

156. *Trixanthocereus* Backbg., 1937g, Blätt. f. Kakteenf., 1937-7. Type: *Cephalocereus blossfeldiorum* Werd. This genus is characterized by funnelform flowers with silky wool from the older part of the cephalium, by fruits with silky hairs, and by large, soft, brown seeds resembling those of *Astrophytum*. Young plants have the long bristles at the base of the stems as in *Micranthocereus*. This may be one indiction of a close relationship between the cephalocerei of eastern Brazil and of western South America. That these nocturnal cerei may be very old is suggested by the very wide distribution of *Pilocereus*, from Mexico to the West Indies and on both sides of the Andes. This is a distribution very much like *Melocactus*, the only other genus of the Cactaceae with such wide distribution.

T. blossfeldiorum (Werd.) Backbg., 1937g, Blätt. f. Kakteenf., 1937-7; 1938a, Blätt. f. Kakteenf., 1938-1.

157. *Pseudoespostoa* Backbg., 1934j, Blätt. f. Kakteenf., 1934-10. First mentioned in Backeberg, 1933g, Der Kakteen-Fr.: 61. Type: *Cephalocereus melanostele* Vaupel. This genus is characterized by a superficial cephalium running down one side (not from a groove as in *Espostoa*), and by nearly naked fruits.

P. melanostele (Vpl.) Backbg., 1934j, Blätt. f. Kakteenf., 1934-10. See discussion under 77. *Haageocereus*.

P. melanostele var. *inermis* Backbg., in Backeberg & Knuth, 1935, Kaktus-ABC: 340, without Latin diagnosis. As validating diagnosis: Differt ab typo areolibus aculeis longioribus deficientibus. This variety lacks the long central spines of the type of the species and grows in somewhat higher places (as near Matucana).

158. *Neobinghamia* Backbg., 1950f, Cact. & Succ. Journ. Am.: 154. Type: *Binghamia climaxantha* Werd. This genus is characterized by an annular zone of white wool which is grown through each successive year, and by funnelform-campanulate flowers with somewhat woolly tubes arising from the year-old wool-zone (not from the youngest zone as in *Neodawsonia*). The fruits are also somewhat woolly.

N. climaxantha (Werd.) Backbg., 1944, Cact. Jahrb. DKG.: 26.

159. *Espostoa sericata* (Werd.) Backbg., 1934h, Blätt. f. Kakteenf., 1934-8. Syn. *Cereus lanatus* subsp. *sericatus* Werd. & Backbg., in Backeberg, 1931, Neue Kakteen: 71. *Espostoa lanata* has long, red-tipped central spines and some reddish radials, while *E. sericata* has no distinct longer, central spines, and has yellowish-white radials between the white ones. In habitats where both species occur hybrids are found between them.

160. *Austrocephalocereus* Backbg., 1938e, Blätt. f. Kakteenf., 1938-6. Type: *Cephalocereus purpureus* Gürke. This genus is characterized by naked, campanulate flowers from a unilateral, superficial cephalium, and by small, smooth, operculate fruits (although fruits not known in the type species). It differs from *Cephalocereus* by its naked flowers and from *Haseltonia* by its unconstricted, uncurved body-form. The cephalium-bearing pachycerei and cephalocerei must surely be regarded as representing parallel developments, although they cannot as yet be compared with complete satisfaction due to the lack of critical flower and fruit data in several species.

A. dybowskii (Goss.) comb. nov.

A. lehmannianus (Werd.) comb. nov.

A. purpureus (Gürke) Backbg., 1938e, Blätt. f. Kakteenf., 1938-6.

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[1]Edited by E. Yale Dawson.

161. *Coleocephalocereus* Backbg., 1938e, Blätt. f. Kakteenf., 1938-6. Type: *Cereus fluminensis* Miquel. This genus is distinguished by naked, funnelform flowers from a woolly and bristly cephalium borne in a groove (as in *Espostoa*), and by smooth, operculate fruits (unlike *Espostoa*).
C. fluminensis (Miquel) Backbg., 1938e, Blätt. f. Kakteenf., 1938-6.

163. *Arrojadoa penicillata* var. *decumbens* Backbg. & Voll, in Backeberg, 1949h, Arqu. Jard. Bot. Rio de Janeiro: 159, 164-165.

NATIO 10. Cephalocacti

SUBNATIO 1. Heliocephalocacti

164. *Melocactus jansenianus* Backbg., 1933f, Der Kakteen-Fr.: 54; photo in Backeberg, 1935b, Blätt. f. Kakteenf., 1935-2. This plant from Lomas de Laredo, Peru, is not identical with the *Melocactus* found in the north, in the Despoblado Desert near Moropón. The latter is still undescribed.

SUBTRIBE 2. Boreocactinae

NATIO 1. Boreoechinocacti

SUBNATIO 1. Euboreoechinocacti

167. *Astrophytum* Lem.
Subgenus 1. *Euastrophytum* Backbg., 1950f, Cact. & Succ. Journ. Am.: 154. Type: *Astrophytum myriostigma* Lem. In these plants the fruits burst radially.
Subgenus 2. *Neoastrophytum* Backbg., 1950f, Cact. & Succ. Journ. Am.: 154. Type: *Echinocactus asterias* Zucc. In these plants the fruits open at the base. All have a red center in the flower.

175. *Echinofossulocactus caespitosus* Backbg., 1950e, Cact. & Succ. Journ. Gr. Brit.: 81, 84.
E. guerraianus Backbg., 1942, Fedde Rep.: 63. This is the largest known species of the genus.

180. *Thelocactus flavidispinus* (Backbg.) comb. nov. Syn. *Thelocactus bicolor* var. *flavidispinus* Backbg., 1941b, Beitr. Sukkulentenk.-pflege: 6. This plant seems to have quite a different habit than the species to which it was formerly referred.
T. schwarzii Backbg., 1950e, Cact. & Succ. Journ. Gr. Brit.: 81, 84.

181. *Strombocactus* Br. & R.
Subgenus 1. *Turbinicactus* Backbg., 1936a, Blätt. f. Kakteenf., 1936-1. A name no longer useful when subgenus 2, *Turbinicarpus* was raised to genus status.

184. *Turbinicarpus* (Backbg.) Buxbaum & Backbg., in Buxbaum, 1936, Cact. Jahrb. DKG: 20. Syn. *Strombocactus* subgenus *Turbinicarpus* Backbg., 1936a, Blätt. f. Kakteenf., 1936-1. Type: *Echinocactus schmiedickeanus* Böd. This name embraces a group of dwarfish plants with peculiar, soft spines, early deciduous, the flowers with very short tube and berry-fruits splitting at the top.
T. klinkerianus Backbg. & Jacobs, 1948, Sukkulentenk. Jahrb. Schw. KG: 27.
T. lophophoroides (Werd.) Buxbaum & Backbg., in Buxbaum, 1937, Cact. Jahrb. DKG: 26.
T. macrochele (Werd.) Buxbaum & Backbg., in Buxbaum, 1937, Cact. Jahrb. DKG: 27. Syn. *Strombocactus macrochele* (Werd.) Backbg., 1936a, Blätt. f. Kakteenf., 1936-1.
T. pseudomacrochele (Backbg.) Buxbaum & Backbg., in Buxbaum, 1937, Cact. Jahrb. DKG.: 27. Syn. *Strombocactus pseudomacrochele* Backbg., 1935f, Blätt. f. Kakteenf., 1935-6.
T. schmiedickeanus (Böd.) Buxbaum & Backbg., in Buxbaum, 1937, Cact. Jahrb. DKG.: 27.
T. schwarzii (Shurly) comb. nov.

186. *Gymnocactus* Backbg., 1938e, Blätt. f. Kakteenf., 1938-6. Type: *Echinocactus saueri* Böd. The plants of this genus are characterized by woolly apex, non-deciduous spines, flowers borne in the youngest areoles, short, naked tubes, berry-like, smooth fruits, sometimes with a scale at the top. They comprise a group which Knuth, in Backeberg & Knuth, 1935: 366, placed in series Beguinianae of *Neo-*

lloydia. They are not neolloydias, however, for they lack the areolar groove. The species resemble each other in habit and the majority of them have purple flowers.

G. beguinii (Web.) comb. nov.
G. gielsdorfianus (Werd.) comb. nov.
G. horripilus (Lem.) comb. nov.
G. knuthianus (Böd.) comb. nov.
G. saueri (Böd.) Backbg., 1938e, Blätt. f. Kakteenf., 1938-6.
G. saussieri (Web.) comb. nov.
G. subterraneus (Backbg.) comb. nov. Syn. *Thelocactus subterraneus* Backbg., 1932e, Der Kakteen-Fr.: 110. *Rapicactus subterraneus* (Backbg.) Buxbaum. The peculiar roots are not generically characteristic, but are also found in some South American species such as *Weingartia fidaiana* and *W. neumanniana.* The flowers do not differ from those of *Gymnocactus.*
G. viereckii (Werd.) comb. nov.

SUBNATIO 2. Mediocoryphanthanae

189. *Glandulicactus* Backbg., 1938e, Blätt. f. Kakteenf., 1938-6. Type: *Echinocactus uncinatus* Gal. The plants of this genus are characterized by tubercular ribs, areolar grooves with several glands, flowers appearing at the end of the groove farthest from the tip of the tubercles. The glands are sometimes elongated and suggest stunted spines.
G. crassihamatus (Web.) Backbg., 1940f, Beitr. Sukkulentenk.-pflege: 6-8.
G. uncinatus (Web.) Backbg., 1938e, Blätt. f. Kakteenf., 1938-6.

NATIO 2. Mamillariae

SUBNATIO 1. Coryphanthae

191. *Neolloydia* Br. & R.
Subgenus 1. *Euneolloydia* Backbg., 1938e, Blätt. f. Kakteenf., 1938-6.
N. matehualensis Backbg., 1948a, The Spine: 108, 112.
N. pulleineana Backbg., 1948a, The Spine: 108, 112.
Subgenus 2. *Cumarinia* Knuth, in Backeberg & Knuth, 1935, Kaktus-ABC: 379 (as subgenus under *Coryphantha*).
N. odorata (Böd.) Backbg., 1937c, Blätt. f. Kakteenf., 1937-3. This plant has very soft flesh. It was the type of Knuth's subgenus *Cumarinia* of *Coryphantha,* but the waterless, small fruits and the hard black seeds show that it belongs in *Neolloydia.*

194. *Lepidocoryphantha* Backbg., 1938e, Blätt. f. Kakteenf., 1938-6. Type: *Mamillaria macromeris* Engelm. This genus is distinguished by the following characters: areolar groove extending only to the middle of the tubercle; ovary with a few scales with hairy (!) axils.
L. macromeris (Engelm.) Backbg., 1938e, Blätt. f. Kakteenf., 1938-6.

195. *Coryphantha* Lem.
Subgenus 1. *Neocoryphantha* Backbg., 1942a, Cact. Jahrb. DKG: 61, 78. Type: *Mamillaria clavata* Scheidw. This subgenus is distinguished by flowers in which the ovary has 1-2 long, slender scales whose axils are naked.
Subgenus 2. *Eucoryphantha* Backbg., 1942a, Cact. Jahrb. DKG: 61, 78. This subgenus is distinguished by naked flowers and fruits (without scales, felt or hairs).
C. mais-tablasensis Backbg., 1949a, Blätt. f. Sukkulentenk.: 5.
C. pseudonickelsae Backbg., 1949a, Blätt. f. Sukkulentenk.: 8.
C. villarensis Backbg., 1942, Fedde Rep.: 64.

196. *Roseocactus kotchoubeyanus* var. *albiflorus* Backbg., 1935n, Der Kakteen-Fr.: 66, without Latin diagnosis, but with flower photo. As validating diagnosis: Differt floribus satis, magnis, albis.

198. *Pelecyphora pseudopectinata* Backbg., 1935m, Kakteenk.: 98. This plant resembles a species of *Solisia* closely except for the flowers which arise at the apex, and the fruits which are very small and unlike those of *Mamillaria.*

SUBNATIO 2. Eumamillariae

201. *Mamillaria albiflora* (Werd.) Backbg., 1937b, Blätt. f. Kakteenf., 1937-2. Syn. *Mamillaria herrerae* var. *albiflora* Werd. A plant of cylindrical growth-form, with turnip root and rather large flowers.
M. albilanata Backbg., 1939j, Kakteenkunde: 42.
M. atrohamata nomen nudum, in Backeberg 1937m, 10 Jahre Kakteenf. (catalog): 29.
M. aureilanata Backbg., 1938, Beitr. Sukkulentenk.-pflege: 13. A nomen novum for *Mamillaria cephalophora* Quehl, a preoccupied name.
M. aureilanata var. *alba* Backbg., 1949a, Blätt. f. Sukkulentenk.: 1.
M. bella Backbg., 1942, Fedde Rep.: 63.
M. eucantha Backbg., 1944, Cact. Jahrb. DKG.: 101. A nomen novum for *Mamillaria coronaria* K. Sch. Syn.: *Mamillaria neocoronaria* Knuth, in Backeberg & Knuth, 1935: 392.
M. floresii Backbg., 1949a, Blätt. f. Sukkulentenk.: 1.
M. fraileana (Br. & R.) Backbg., 1934f, Blätt. f. Kakteenf., 1934-6.
M. fuauxiana Backbg., 1950d, Fuaux Herb. Bull.: 53.
M. gueldemanniana Backbg., 1941c, Beitr. Sukkulentenk.-pflege: 57. Syn. *Mamillaria guirocobensis* Craig.
M. guerreronis (Bravo) Backbg., in Backeberg & Knuth, 1935, Kaktus-ABC: 391.
M. guerreronis var. *zopilotensis* (Craig) Backbg., comb. nov. This is merely a variant with more hooked spines.
M. ingens Backbg., 1942, Fedde Rep.: 63.
M. neophaeacantha Backbg., 1949a, Blätt. f. Sukkulentenk.: 5. This plant differs from *Mamillaria tetracantha* Salm-Dyck in its more cylindrical form, in its non-keeled tubercles, in its stiff, straight, blackish spines of which the lower is not the longest, and in the absence of short areolar bristles.
M. neoschwarzeana Backbg., 1949a, Blätt. f. Sukkulentenk.: 5.
M. pachyrhiza Backbg., 1939a, Beitr. Sukkulentenk.-pflege: 39.
M. rubida Backbg., 1949a, Blätt. f. Sukkulentenk.: 5.
M. subdurispina Backbg., 1949a, Blätt. f. Sukkulentenk: 5.
M. subtilis Backbg., 1950e, Cactus & Succ. Journ. Gr. Brit.: 81, 84.
M. wuthenauiana Backbg., 1942, Fedde Rep.: 64.

203. *Dolichothele* Br. & R., emend. Backbg., 1950f, Cact. & Succ. Journ. Am.: 154. Type: *Mamillaria longimamma* DC.
D. albescens (Tieg.) comb. nov.
D. albescens var. *centrispina* nomen nudum, in Backeberg, 1937m, 10 Jahre Kakteenf. (catalog): 29.
D. aylostera (Werd.) comb. nov.
D. baumii (Böd.) comb. nov.
D. surculosa (Böd.) comb. nov.

204. *Krainzia* Backbg., 1938e, Blätt. f. Kakteenf., 1938-6. Type: *Neomammillaria longiflora* Br. & R. This genus is distinguished by its flowers which have long, slender tubes with some scales, and by the seeds which lack the thick, corky base of *Phellosperma*.
K. guelzowiana (Werd.) comb. nov.
K. longiflora (Br. & R.) Backbg., 1938e, Blätt. f. Kakteenf., 1938-6.

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PLANT WANTED

Espostoa lanata about three to four feet high.

Astrophytum myriostigma one to two feet high.

I am very anxious to find these two plants and would like to hear from some one collector or dealer.

MICHAEL KOVACS

521 N. San Mateo Albuquerque New Mexico

WANTED NATIVE CACTI

I am interested in cacti that are native to California and to closely adjoining regions of Arizona and Lower California. I do not care about growing them in quantity but wish to obtain single specmiens of the species that I do not have. Would like to hear from society members.

T. G. KENNARD

20747 E. Palm Drive Glendora California

PRINCIPLES OF PLANT REPRODUCTION

By R. C. PROCTOR

PART II

Continued from page 111, Vol. XXIII, No. 4

Mutations

Gregor Mendel's law of heredity holds true "basically," it has been explored, and proven, in many directions, but it must be taken with the reservation, *unless conditions interfere.* We all know that extreme cold or lack of rain stunts a great many types of plants and that certain diseases cause certain animals to grow into runts. An inactive thyroid gland may cause one child to be a dwarf while an over-active thyroid turns another into a freakish giant. Butterflies of a certain type are spotted in one climate though not in another, and there are pigeons whose feathers are normally pale in dry regions but darken considerably when exposed to an atmosphere of moisture and warmth. In Arizona there are many geographical variations in the cactus species and there are many differences in spines, flower colors and other aspects of the species that are scattered over a wide variety of habitats. *Opuntia basilaris,* in Arizona, bears rose-pink flowers only but up in Nevada there is a variety—possibly a mutation—that puts out white flowers; a rarity among day flowering cacti.

No, "genes are not free agents nor do they control all the aspects of heredity," says Carrol Lane Fenton, in his book, *Our Living World.* "They merely cause the development of one characteristic or another according to conditions under which they work."

In other words and according to *A Textbook of General Botany* by The MacMillan Company, " . . . offspring do not literally inherit characters from their parents, except the structural and functional characters of the spores or gametes which give rise to the offspring. . . . All that the new generation inherits is certain substances which . . . make possible the development of characters like those of the parent."

In the main, it is the substances carried in the chromosomes that are the essential mechanisms of inheritance.

A Textbook of General Botany further states: "These substances endow the organism with certain possibilities of development; whether, or to what extent, those possibilities are to be realized depends upon the environment that surrounds the organism while it is developing. The actual characters that the mature plant or animal displays are therefore the results of an interplay of inherited tendencies and environmental influences."

Sometimes a cell or many cells of a plant's tissues make sudden, and often unaccountable, changes. The changes are owing to unusual variations in the genes and are called "mutations"—according to *The Story of Plants* by John Ash; an interesting study of botany for the laymen—and there are as many kind of mutations from as many different causes.

Often, new genes are formed while old ones vanish, or the arrangement of the atoms may be disturbed in a gene thereby changing its character. Sometimes during cell division genes divide more than once, adding one or more genes to a daughter gamete. Or a gene may fail to divide at all, thus depriving a daughter gamete of its usual quota, by one.

Nobody seems to know exactly how mutations of genes and chromosomes occur but it is believed that some of them are reactions to the bombardment of free electrons from unstable atoms; yet no one has ever seen a gene or an atom. Some mutations may be caused by atmospheric disturbances such as lightning or a sudden change in temperature.

By scientific experiments certain experts have found that changes in genes can be affected by use of chemicals, X-rays and radioactive elements.

It is believed that a good portion of the present day living forms have been handed down through the generations for a few years, a few centuries or even for millions of years; and that they are the descendants of mutations that at one time occurred and having found every condition present that was favorable to their existence . . . clicked.

In search for something definite on cactus mutations that would bear authoritative confirmation I have met with uncertain possibilities: that is, many of the variety of forms and even clear cut species could be the results of mutations. But further investigation has convinced me that mutation is responsible for many variations and is the common rule.

In this connection I am taking the liberty of repeating a few lines from a letter so kindly written, in response to my request for enlighten-

ment on the subject, by a well know botanist, R. H. Peebles, agronomist for the U. S. Department of Agriculture's Bureau of Plant Industry, at Sacanton, Arizona:

—"Mutation is the rule rather than the exception in all life, and I should be very much astonished if mutations do not occur in the cactus family. As to the variant forms of *Echinocereus Fendleri* arising from mutation, that could very well be the case. But such variation is not looked upon as abnormal. If it were not for mutations the only way new forms could arise would be through hybridization and recombination. This is a subject that has been argued over ever since Darwin advanced his theories, but there seems to be a world of evidence that mutation is responsible for a great deal of variation and is a vital factor in speciation."

Mr. Peebles, in his letter, goes on to say: "I certainly am not an authority on this subject but merely have looked into it a little in order to have a better understanding of the principles involved in plant breeding."

And, certainly, this writer is no authority on genes, chromosomes and mutations. As a matter-of-fact I am here treading on very unfamiliar ground. But since I have looked into the subject it appears to me that it has been argued pro and con, and is debatable and open for much speculation. However, I can certainly recommend a deeper study of it than can be done through a Journal article. For the curious mind it will provide many interesting—though not necessarily correct—solutions to the mysteries of life.

Apparently, from what I have gathered on the subject, mutation and cross-fertilization are the chief factors in the development of species and variations, from which nature selects those forms—the fittest—that are best adapted to the conditions under which they must live. As new variations appear and environmental conditions change, nature selects only those forms that can change in the right direction. Advantageous variations are then perpetuated by being transmitted to offspring; and new changes that occur, if they are appropriate, are added to the accumulation of the old ones. Some changes come about gradually by the accumulation of new genes while others appear suddenly as hybrids or mutations. Some of the changes, it is said, may alter only one character of an organism or they may result in entirely new species. Some plant forms, it is believed, have existed unchanged for millions of years but a great many others have undergone, and are still going through, some very rapid changes.

Therefore we might conclude that mutations, apart from cross-fertilizations, are chiefly responsible for new forms and variations in our world of living things. And the environments determine how long they shall endure.

Adaptations? Or Natural Selections?

However one chooses to regard living organisms, as adaptations, natural selections or survivals of the fittest, the question of which is true may never be settled in the minds of some people. That cacti and other plants adapt themselves of their own volition to their environments or that they are selected according to fitness or certain qualifications demanded by nature seems to me as merely two concepts of the same biological force—the will to live in harmony with the natural laws.

Being selected by nature, simply implies being adaptable to nature or, as some people like to think of it, the survival of the fittest.

But let us consider what an authority has written on the subject:

From Smithsonian Scientific Series, Volume 11, *Old and New Plant Lore,* I repeat the words of Daniel Trembly MacDougal: "... For the life of desert regions—whether plant or animal —is distinctive. It differs both in appearance and habits from life of moister environments. The differences are *adaptations* that are always advantageous and sometimes indispensable to existence in the desert. That the desert *molds* organisms to a higher degree of fitness for life under the trying conditions it presents cannot be proved; but if anything in the vast accumulation of data on plant history is certain, it is that plants which do not now show certain specialized structures and habits will die out in dry regions."

A few minds object to the term "adaptation," in this connection, and prefer the idea of natural selection that Nature or God endowed plants with the necessary characteristics to live in harmony with the environments. Some believe the environments determine how the plants are to exist, even choosing the types. Any one and all of these concepts could be true for they imply the same meaning, which is adaptation. Nothing exists in this world without first becoming adapted to it, but how it does it or what makes it do it poses the important question. At least that seems to be the general idea.

Seeds

Vegetative reproduction enables an individual plant to perpetuate its kind and to occupy adjacent territory quickly and in great numbers—provided that the proper conditions are present to bring its particular virtues into play. But if this were the only method of reproduction there could be no new species, and any drastic change

in the environments would exterminate the old ones.

Seeds—the offspring, usually, of two plants—spread the species over a greater range of territory while they also contribute greatly to the perpetuation of their kinds. And they are a vital factor in the development of variations and new species.

But before there can be seeds there must be flowers; and flowers were not created to please our tastes for gaudy colors; their one and only purpose is to produce seeds.

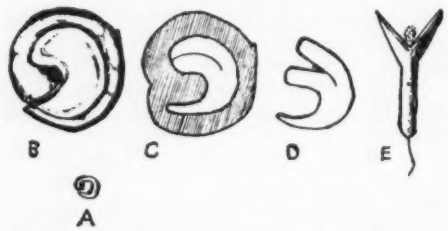

FIG. 89. Seed and embryo—*Opuntia engelmannii*: A—Seed: Three-fourths size. B—Seed, greatly enlarged to show coat of embryo. C—One section of coat removed showing embryo. D—After planting, embryo begins to unfold into two cotyledons. E—The minature plant is sustained by, and between the cotyledons or seed leaves.

The contents of a fertile seed consists of an embryo, or miniature plant, and nourishment to sustain the embryo when it begins to grow until it puts out roots of its own. This tiny plant, or embryo, can be seen in large seeds after their coatings have been removed. But most cactus seeds are so small the embryo is visible only through a powerful magnifying glass.

The development of a seed embryo involves the transfer of a live pollen grain from the anther of an appropriate plant to a stigma that is receptive. The pollen grain must be able to germinate and form a tube down through the style to the ovary where it can reach an embryo sac in one of the ovules at just the proper moment when the female gamete is fully developed and ready to receive the male gamete of the pollen grain. If this function is properly performed the two gametes will unite into a single fertilized egg, or zygote, out of which will develop a miniature plant of the next generation. The ovule is thus changed to a seed and the ovary is transformed into a fruit that protects the seeds and aids in their dispersal.

There may be as many seeds in a fruit as there are ovules. But where there is a large number of ovules rarely are they all fertilized and converted to seeds. This may be attributed to various causes: A plant may not be able to provide all the ovules with proper nutrients and water. Also, the ovules in an ovary compete with one another and with all the other ovules in the rest of the plant. Those that are fertilized first get a head start and the ones that receive a better set of chromosomes from the male pollen sperm are better enabled to develop good seeds.

If every ovule in an ovary is to be fertilized each must receive two male sperms that come to it through the pollen tube, and the tube must be formed by a single pollen grain. And if an ovary is to produce a hundred or a thousand fertile seeds its stigma, in the flower, must be pollinated by at least that number of compatible pollen grains—one for each seed. Also, each pollen grain, or the sperm from such, must form its own tube through the style so that it can make contact with its particular choice of ovule. The pollen grains need not come from the same male parent, therefore the seeds from the same fruit, and the plants resulting from these seeds, may be different in many respects . . . although all of them came from the same female parent. But the characteristics of the offspring plants may be regulated, if desired, by a breeder in the selection of the male parents—where pollination can be controlled. A plant can be male or female, depending upon which

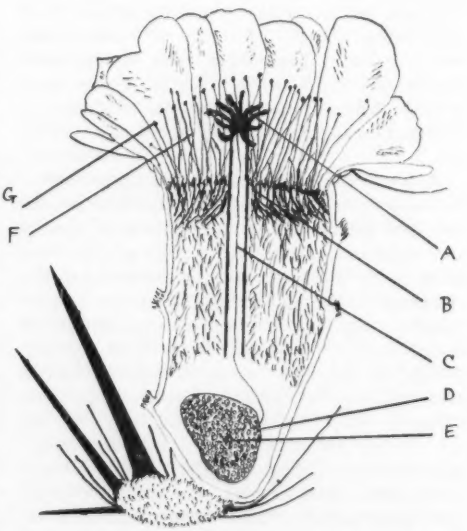

FIG. 90. A typical cactus flower: A—stigma: segmented into lobes and expanded to receive pollen. B—Style: greatly exagerated to show pollen tube. C—Pollen tube. D—Ovary. E—Ovules. Those that can be fertilized will become seeds. F—Stamens. G—Anthers at ends of the filaments produce pollen. The stigma, style and ovary make up the pistil, or female organ. Anthers and filaments make up the male organs, or stamens.

supplies the pollen (the male) and which receives it (the female).

In any large crop of seeds there is always some bad ones but these can be separated from the rest by dropping the lot in a container of water. The bad ones, having no embryo, will rise to the surface slowly—some take a few days—and the fertile ones will remain on the bottom of the container.

Flower Buds

Plants that grow and flower during spring and summer, as most cacti do, also develop their flower buds at that time. That is, if, and when, new growth takes place at all . . . for in many cacti, a stem or its buds, or both, may remain dormant not only through their winter resting period but through summer, also. Sometimes the buds alone remain dormant while the rest of the plant grows, and sometimes for more than one season. Or a bud may finally erupt after its extended arrested growth and then fall off the plant. But, ordinarily, flower buds and other new plant structures continue growth up to the end of the warm summer weather—if the plant gets sufficient moisture. Then when cold weather begins they enter a state of dormancy, or rest, during all winter.

Growth is resumed when summer returns but even so if the water content of a cactus plant is dangerously low, all its functions of growth will be suspended and life continued in an arrested state until a little moisture comes along—for only so much water is there so much growth.

Forced growth of a cactus by excessive or out-of-season watering and heat may make it fat and pretty but such treatment does not encourage old buds to flower or new ones to develop. All the growing points of a cactus need their winter rest; normally the buds will develop into flowers when the proper conditions for growth are present again.

The formation of flower buds is initiated along with the areoles, spines, tubercles and other new members of a plant—if conditions are favorable—at the growing points of the stem, branches and joints. The new bud formations begin at certain seasonal periods, depending upon the growing habits of the species, during which time certain daughter cells are set apart to develop the female organs of the flowers.

But at any or all of the steps from the initiation of the flower parts in the growing points of a plant to the completion of the fertile fruits, the sexual parts of any growth they develop—the zygote, the embryo, the seed and the fruit—may be left out because of slow growth, insufficient growth, age of the plant, poor internal nutritive and water balance, incompatible weather and incompatibility between the sexual organs of the flowers—and, in the case of the cacti, wrong timing of pollination, watering and feeding.

Moreover, before a plant can produce fertile seeds its growing points must have the inherited ability to form daughter cells that can develop floral parts. A plant that does not have such inherited ability or is too young may be given the most meticulous care in cultivation yet it cannot begin to form reproductive cells. And even if a plant does have the ability to form sexual cells it must also have an adequate store of properly balanced reserve food and water before floral structures can develop into healthy flowers that can produce potent male and female spores. Its temperature and light requirements must also be satisfied and it must be healthy.

But don't let that discourage you if you happen to have a litter of those non-blooming Echinopsis pups or any others—of heaven only knows what breed—that are early bloomers but fail to live up to their reputation as such. Because many cactus plants that refuse to flower can be prodded along to do so if they have the inherent qualities to develop the necessary daughter cells, and most of them do. Ordinarily, they can be induced to form buds by various means, if one cares to go to the necessary trouble, such as regulating the amount and duration of light.

Cactus plants, with a few exceptions, require a great deal of sunshine to encourage flower buds yet the continuous exposure to unbroken sunlight or any kind of light seems to prevent rather than induce flowering.

Some authorities claim that most plants will not bear flowers at all if they are exposed to unbroken light, which probably explains the abundance of flowers on a cactus plant in nature where most of them grow among grasses, shrubs and weeds that provide the benefit of shimmering, rather than steady, sunlight.

It has been found that prolonged, intermittent exposures of cactus plants to fluorescent light induces flowers and causes them to last continuously, and longer than usual. It is also known that healthy growth can be induced in the same manner. This should be heartening to those who strive for flowers from stubborn plants, and in cloudy, rainy regions, but the treatment can be carried to excess, it should be born in mind, and cacti must have their winter rest.

The application of various chemicals to the soil are supposed to encourage buds when used in the form of gasses or liquids . . . or in the form of pastes and radioactive elements when applied to the plants. Pruning of roots helps

. . . and driving pieces of rusty iron (small ones, of course) into the stem; also the regulation of the internal water and nutritive relationships by withholding water and introducing nitrogen to the soil.

It is not likely that cacti in pots and gardens, or private collections in city dwellings would be getting the proper amount of nitrogen to ensure new buds or the final development of old ones. For my own plants I have found that certain fertilizers, rich in iitrogen, are effective, giving them a new lease on life and restores their ability to grow new buds, spines and tips; although I am not positive that it was the nitrogen alone that produced the buds in my experiments. At any rate, one should check his fertilizer for nitrogen if he expects flower, or store up some rain water during the electrical storms for use during the dry periods when the plants need a drink. It is the lightning, needless to say, that charges the rain with nitrogen that reaches the roots of plants in the open but in some regions there are not enough electrical showers to suit the needs of the cactus plants in cultivation.

Most cactus growers know about the ailment of bud dropping that is suffered by some plants, or as most often happens they dry up and die; a condition that seems most prevalent with the slender stemmed night blooming cacti, or Cerei. But I have stumbled upon a remedy in a general botany book and from experiments I have made it evidently works; at least I am convinced that it does. You may take it with the proverbial "grain of salt" but here is how it is done:

After a bud has erupted—or better yet, before it erupts if it can be located—notching or ringing of the stem just below the bud area will cause a great deal of the descending food to enter the bud instead of passing on down to the roots. This treatment not only induces healthy sexual organs and spores but, to a large extent, strengthens a bud's attachment to the plant and is not so apt to fall off.

No treatment of a cactus for the inducement of fertile seeds is worth the trouble unless more than one plant with flowers are accessible to the insects' or one's own method for cross-pollination. Ordinarily, a plant's own pollen is not potent enough to form the pollen tube through the style or, to put it another way, the chemistry of the style and stigma will not aid the pollen in forming the tube; often rejecting it outright. But even should the pollen succeed in reaching a happy medium with the female parts of its plant's own flowers the seeds thus fertilized, if they are fertilized, are not likely to germinate—except, perhaps, once in a blue moon.

To be continued

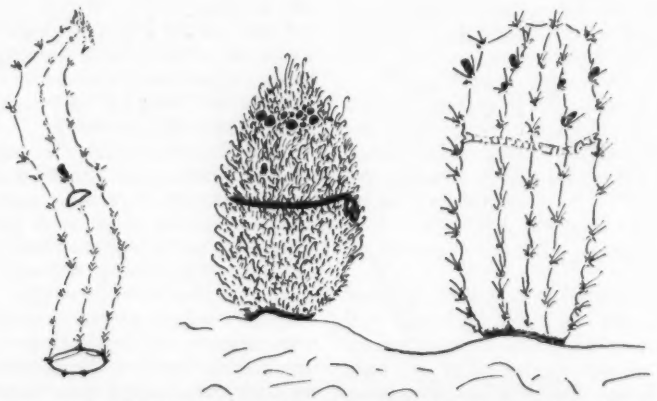

FIG. 91. LEFT: Notching below a bud. CENTER: Ringing, by constricting the stem below the bud area with a tightly drawn string. RIGHT: Ringing, by notching a complete circle around the stem just below the bud area or near top of plant where buds usually occur. Notching or ringing a plant (if you don't mind mutilating it) encourages buds by causing a high percentage of nutrients to enter the bud areas instead of all descending to the roots.

Order the new Aloe book now and check your plants. Dr. Reynold's 650 page monograph with 572 illustrations and 75 color plates is now available. Order your copy now. $14.50 postpaid in U. S. A. plus tax on California sales. Exclusive distributor in North America: Abbey Garden Press, 132 W. Union, Pasadena 1, California.

FIG. 92. Flowers and fruit of *Nopalxochia Conzattianum*.

NOPALXOCHIA CONZATTIANUM

By T. MACDOUGALL

Since its description, in February, 1947, little has been heard of this new "Orchid Cactus." Presumably the recent cold winters on the west coast raised havoc with the stock our Editor so generously distributed.

In June of 1950 the type* plant flowered freely (see fig. 92) and for several weeks the rich red blossoms were a delight.

The "type" flower of *Nopalxochia Conzattianum* was sent to Srta. Lelia Conzatti, in Oaxaca, and now occupies a page in an album dedicated to the 86th birthday of Professor Cassiano Conzatti. Although the herbarium of Prof. Conzatti is known throughout the botanical world, it can hardly be claimed that the Nopalxochia flower was deposited there, and this infraction of botanical regulation left the writer open to the censure of orthodox taxonomists.

Since that time, partial amends have been made, and material from the type plant now rests in the herbarium of the New York Botanical Garden. So long as living material is available, and in view of the fact that the original description was based on fresh material, it is unlikely that collectors will have recourse to the herbarium specimens for identification. Herbarium specimens of cacti can be sorry affairs!

*In a greenhouse at 4000 Boston Road, New York City.

Last year several flowers, on the type plant, set fruit with the pollen of *Nopalxochia phyllanthoides,* and two of these fruits were photographed while still green and immature (see fig. 92). By the late summer and early fall, although the fruit had filled out and fully ripened, the color remained green—like the ripe fruit of *Heliocereus.*

The following are measurements and descriptions of an average fruit from the type plant of *Nopalxochia Conzattianum:*

Oval, 4 cm. long by 3 cm. in diameter. Apple-green, with several pronounced ridges. Twelve areoles, each bearing approximately 10 short bristles, arising from the inner base of scales, are scattered along the ridges.

Scales ovate, minute to 4 mm. long.

Pulp whitish-translucent, acidulous and agreeable to the taste.

Seed numerous, dark brown, distributed throughout the pulp.

It will be noted that the fruit of *Nopalxochia Conzattianum* resembles that of *Heliocereus* spp., but it also appears to resemble the fruit of *N. phyllanthoides* and this genus still seems the logical place for our species.

May I repeat the hope that the specific name may survive re-classifications in the Cactaceae. It is the tribute of the writer to a, now departed, friend.

Since the discovery of *N. Conzattianum*—and this goes back to the winter of 1939-40—the known habitat range has not been extended, and is still confined to the top of Cerro de Lachiguiri, in Oaxaca. Perhaps it will prove to be endemic to this rather isolated mountain, but my guess is it grows also in the cloud forests of one or more peaks to the north-west of Santiago Lachiguiri.

ROUND ROBIN NEWS

In my mail one day a few weeks ago was an interesting letter from the president of the Cactus and Succulent Society of New Zealand, Mr. A. B. Cutler, of Auckland, New Zealand. He writes as follows:

"This letter will no doubt come as a surprise since it is from such an out of the way corner of the world. However, the subject is *Cactus.* I am the president of the Cactus & Succulent Society of N. Z., and as such endeavour to get as much out of the hobby as possible. To do this it is necessary to put in as much as possible. The booklet herewith is a copy of our monthly journal, distributed free to all our members. At present there are 500 scattered throughout N. Z. and a few in other parts including a few in America and Canada. Compared with your country we are just beginners, few of us having been in the fancy more than 10 years. We also suffer from a lack of people who can talk on the scientific aspect of our hobby, hence the general tone of our journal must be kept to the level of our members. Our Society was born just over three years ago with 15 members. Once firmly established we began to expand and so branches have sprung up in 5 main centres. Another two branches seem possible in the near future. A few of us have managed to arrange for dollars and so have joined the American Society. The balance of the members have to be content with borrowing the American Journal which we receive for the Society Library.

My object in writing you is to suggest that these Round Robins of yours could possibly be extended outside America. Up our end of N. Z. the climate is very similar to California, but at the southern end they get frozen in during the winter. Probably most of the generally kept plants can be found in our collections though of course the rarer ones are missing, mainly because it is so difficult to arrange payment with the dollar trouble. We are able to import many species from the growers in Australia but many of our plants are grown from seed which a few members are occasionally able to get from America. We also have been able to get in seed of the choicer succulents (Lithops, Conophytums, etc.) from Africa. So you will see that we are fairly well off for plants. Our greatest need is reading matter. This may be solved if your Robins could be sent this far. I feel sure that I could interest members here. I got Epiphyllum cuttings from California several years ago and they are doing very well. I fancy I must have about the largest collection of these in N. Z., 150 from Cactus Pete plus a few others acquired locally. I have tried several times to get *Zygocactus bicolor* and also the pure white variety from U. S. A., but somehow they are not sent and something different substituted. Have you ever seen these or am I just wasting time?"

I might add that "Rain Forest" Plants R.R. which include Epiphyllums is on its way to Mr. Cutler and there will be more Robins going to New Zealand in the near future.

Now, for a brief report on the Round Robins.

Mr. J. A. Johnson of Wilmington, Delaware, has written suggesting a Robin on the exhibition of zerophytic plants in flower, hobby or any types of show where they may be exhibited. He has offered to direct this Robin and some of the questions he would like to have taken up are, "How about labeling plants with their names? Is it better to show all of your best specimens and omit the more familiar ten-cent-store varieties? What about backgrounds for small exhibits?" These are only a few of his question picked at random. I expect to be swamped with letters! We need an attractive name for this Robin also.

Lithops R. R. has been changed to Mesembryanthema R. R. It is flying and a fuller report on its activity will be in the next issue.

The following Robins have room for more members: Cactus & Succulent R. R. No. 5; International R. R. No. 2; and Dish Garden, Euphorbia and "Succulents Only" can take one more member in each Robin. I need some directors, too, so am looking for more volunteers.

How about hearing from Hawaii, Canada, South Africa, and a few more places where our Journal goes! Our Robins could circle the globe.

Until next time, good growing and good flying to all!

MABEL H. FAY
123 Nort Avenue, N. Abington, Mass.

THE MAMMILLARIA HANDBOOK—Dr. R. T. Craig, on Mammillarias, contains 400 pages bound in heavy buckram and the same size as the smaller edition of the Britton and Rose Reprint. There are 236 species fully described and illustrated with 300 photographs. $7.50. Postage in U.S.A. 15c, foreign 50c. Abbey Garden Press, 132 W. Union St., Pasadena 1, Calif.

LET'S EXHIBIT

By J. A. JOHNSON

Why not exhibit your cacti? This isn't a question for the big growers and owners of large glass houses, but for the fan who has a few plants in a window garden.

The pleasure of any hobby is increased when you can share it with someone else. I found this to be true when I entered a few plants in the Natural History division of our annual Hobby Show.

Natural History covers many categories. The cactus had to compete for attention with tropical fish, shells, bees, chinchilla rabbits, and other attractions. In spite of that, word must have gotten around and people came especially to see "the cactuses." Quite a few stopped to talk. The interest they showed was a bigger thrill to me than the first-place blue ribbon my entry won.

I have never seen a display of cacti or succulents except in Botanical Gardens. Flower shows are predominantly a display of gorgeous blooms. But in or out of bloom, any season of the year, a cactus can attract attention.

My collection is small, and after eliminating those in poor condition, I had to borrow some plants from my wife who is the succulent fan in the household. It seemed a good idea at the time but now I'm not so sure. Her *Sedum morganianum,* in a five-inch pot, drew the most attention. Now she says that next year she will have a display of her own. After her burros' tail made a jackass of my cacti, I'm stuck with 'em.

Altogether there were thirty-one pieces on display. Twenty-eight were individual specimens in two, three, four, and five-inch clay pots covered with gold colored metal foil and arranged on a flat stand nineteen by twenty-six inches, twelve inches high, covered with black suede paper. In front of the stand was a green ceramic urn planted with succulents and this was flanked by a pair of yellow flat ceramic dishes of cacti and succulents. The whole arrangement was on a table with other exhibits.

Fortunately, most of the questions I was asked could be answered with an example. An *Echinocereus rigidissimus,* in bud, answered the, "Do they bloom?" question and a one-and-a-half inch diameter *Gymnocalycium mihanovichii* that had bloomed the year before, was the reply to, "How large do they grow before they bloom?" The objection to "stickers" was refuted with a *Lophophora williamsii* and an *Ariocarpus fissuratus.* An Epiphyllum and a *Cereus peruvianus* illustrated the "night-blooming cereus" mixup while a *Ferocactus latispinus* served as an example of barrel cactus although my specimen was only keg size in a three-inch pot. My wife's Stapelia helped explain the difference between cacti and succulents and an *Echinopsis eyriesii,* covered with offsets helped answer some questions on propagation. Possibly the only question I couldn't answer was, "Wot kinda cactus izzit that throws it's spines attcha?"

People look for familiar varieties. I should have displayed my *Zygocactus* and *Chamaecereus silvestrii* but I did not consider them to be in condition to show at the time. With my limited facilities, the line between quantity and quality is hard to define. Regardless of the number or kinds displayed, a remarkable number of people are interested in these Zerophytic plants; and there is no better way to stimulate that interest than to meet dozens of people who have been fascinated by them for years but who need new contacts and information about their plants; and it awakens your own interest to keep your collection in top form.

My experience with arrangement and methods of display is too limited to attempt to tell anyone how to do it. I can only urge all cactus and succulent fans, with a dozen plants, to try it and I assure them that they will meet lots of people who have the same interest.

I plan to exhibit my plants again but next time there will be competition from people who saw my initial venture and also from my ever-loving wife. All my attempts to dissuade her are rebutted with my own arguments.

"You say," she quips, "I don't need many plants to make a good showing. Well, I have some very nice Echeverias, Sedums and," she adds, with a look that lets me know she intends to have some very nice plants next year, "a lot of Faucaria, if you'd look after them a little better. Besides, whose Sedum attracted more attention than any one of your cacti?"

You bet it's fun to exhibit. But after you do, remember what Jimmy Durante says, "Everybody wants to get into the act."

* * *

Observations at Twenty-Nine Palms, California
July 7

The Smoke Trees are in full flower and the heavy purple panicles attract thousands of honey bees. *Opuntia ramoisissima* is in fruit as well as *Coryphantha desertii* (Fox Tail Cactus) with its green, ripe fruit. Most of the fruit of *Echinocereus engelmannii* had been eaten by desert animals but a few escaped here and there.

AUTUMN CUTTINGS

From *Monthly Notes on the Neale Collection.* By subscription: Notes on culture and observations of cacti and succulents. Four loose-leaf, well printed photographs mailed each month. Per year $4.75 from your JOURNAL office, 132 West Union Street, Pasadena 1, California.

To many of you, this may seem an odd time to write about cuttings which many amateurs might regard as a thing to be done only in spring and summer. There are of course some types which should not be attempted so late in the year but on the other hand, a large number of true cacti and many of the Euphorbias can be successfully rooted late in the year, or this may take place during the winter and early spring.

Autumn is a time when we always seem to get a burst of growth if water is continued during all warm sunny periods, even if "by the calendar" it appears too late for watering. By continuing the water in moderation of course, plants are kept full of moisture and in a very healthy condition; this then is the best time to take cuttings of varieties which are not too small, in fact big cuts can be taken at this time of year and kept until spring before being put into sand for rooting, but there is a much better method than this which I have found very effective on tests made each autumn for several years.

Before giving details I want to make it quite clear that it does *not* apply to every type of cactus or succulent but many kinds which the average collector will have in his or her collection, can be worked on now with definite benefit for the next year's growth.

Most of the Cereus types of cacti come within this short article, this includes Cleistocactus, Harrisia, etc., in fact most of the plants listed in "The Plant List" up to No. 371. Others to which the following will apply are certain Euphorbias, Aloes, Stapelias, Huernias and Carallumas, (but not all varieties) to say nothing of the leafy types of succulents which root fairly easily if in a good healthy condition.

The big advantage of taking cuttings which *can* be rooted successfully now is that the plants get away early next year as they have little or no time to wait for roots to develop, even if rooting is not quite complete, they may start their growth in February.

Cuttings should be cut with a sharp knife or fine saw and dipped in dry sand immediately, (this applies to Euphorbias in particular as it seals the cut and prevents "bleeding" which weakens the cutting.

Dry in a sunny position (not too hot) for at least three weeks, four or even five weeks often is better. The plant should then be just as when taken from the main plant and provided it has not been in too much sun heat, it will not have shrunken in any way. Given this condition it should establish easily and stand up to the winter (even if roots have not developed much) as it will be requiring NO water at all.

Many experiments have shown that some roots develop before the winter, this may go on very slowly until the spring but even if it does not it is only a matter of a week or so of spring-like weather, to finish the process.

Assuming you have a cutting in the healthy conditions mentioned, pot this up fairly firmly in a soil which is just damp enough to make potting easy. Do NOT fill up with soil but leave about two inches between the soil and top of pot. Now add about one inch of dust-dry sand to the top of the soil and keep quite dry. NO water must be given until very early spring, except in a very hot greenhouse when the slight moisture might be an advantage if the weather is still warm under glass, but generally speaking NO water is best until about February next or may be March.

The dust-dry sand around the base of the plant will filter down into any cracks in the soil which can result from shrinkage. I have many times tested this method to see what roots have developed by midwinter and in some instances a good root system is already in being, while others are resting (without roots) but potted up and ready to make their roots at the first sign of spring.

NOTE: So long as the cutting has been given three to five weeks to thoroughly dry off and has been kept in a warm but not too hot position, there should be NO FEAR whatever of the plant dying, if healthy to begin with. I have kept many experimental cuts in this way in an unheated greenhouse without any damage whatever, and I fully believe the extra dry conditions while resting means they can stand very low temperatures.

While on the subject of plants growing in autumn, may I stress the importance of keeping the growth going as late as the climate allows; a plant fully stocked with moisture when it goes to rest will give far better results next year.

ALOE ARBORESCENS for indoors.

A lot of people miss the beauty of this plant and its flowers as it always blooms in winter. Once you have seen it flower and noted the long time the flowers last you will be more interested in this Aloe.

It has an admirable use which most amateurs (and others) can enjoy, namely as a piece of plant decoration indoors in the living room.

Cuttings root very easily, they like a large pot, ordinary garden soil seems quite suited to them and they make a fine indoor plant for the winter months.

If put outside in the open as soon as the frosts are over and left there until well into the autumn you may find on examination the magnificent flower-spike just showing when you bring it indoors for the winter. It stands fairly cold conditions, will take a little water throughout the winter and if the flower spike is showing, it should bloom in a light or sunny window somewhere around Xmas.

Plants with a leaf span of 12″-18″ should flower each year, they are no trouble at all: just leave them out all the summer and bring them indoors for the three or four worst months.

Under quite normal conditions the flowers will develop indoors but even if they do not, it still makes *a* useful bit of decoration when other things are lacking.

In conclusion, one word about Conophytums. They are late flowering with most of us this year so continue watering until the flowers are finished even if this is well into winter but they *must* have a little warmth to guard against frosts. After flowering is over, stop or cut down to an odd spraying all water until March when a little should be given for about a month before they are allowed to rest. Jan--Feb. are the dry months for these to thrive best in this country, then May-July.

E. LAMB, F.R.H.S.
England

FIG. 93. *Mammillaria viridiflorus* photographed in its habitat in Superior, Arizona.

ARIZONA CACTI

No. 11 of a series by R. C. PROCTOR, Phoenix, Arizona.

QUESTIONS and ANSWERS

Conducted by
HARRY JOHNSON
Paramount, Calif.

Questions:

(1) I have a Stapelia species unknown in which the stems seem to grow too fast but when I let up watering it shrivels up.

(2) How large do the Peruvian Apple and Dayam's Tree Cactus have to be before they branch and flower?

(3) I would like to grow some cacti from seeds but have not much time to baby them along. Would you please tell me some fairly easy types that don't need so much nursing along.

(4) How do you bring *Echinocereus melanocentrus* and *E. Berlandierii* into bloom. G. D. Priddy, Illinnois.

Answers:

(1) Stapelias need a good circulation of air and sunshine to properly mature growth. Without it, or with too much water the stems become long and weak.

(2) The various tree cerei generally first form a trunk before branching. If you want them to branch when small cut the top out when a foot high. As to their size at flowering: seedlings generally take about 4 years to bloom, with proper care. Cuttings from blooming stems will flower even at a foot in length. They are strong rooted plants and about every two or three years they should be repotted. The old soil should be washed off, broken roots trimmed and if the plant is top-heavy, staked.

(3) Growing cacti from seeds is interesting and not particularly arduous, however one must watch the watering to see they do not get too dry. The various Cerei are vigorous and the seed generally germinates well and quickly. The seedlings are generally of fairly good size at the beginning. Mammillarias come up quickly and are easy to handle. They, however, are quite small as the seeds are minute, but big compared to the dust-like Parodia seed.

(4) The Echinocerei, to flower well, like a long cool, or really cold, rest during winter and a sunny, airy position during the growing period. These two species will stand many degrees of frost when winter dormant though I have had them nibbled by early frosts in autumn while still growing. If you can winter them in a frost free basement near a window they should be in splendid condition in March or April to start into growth. They flower before they do much spring growing. The buds of *E. Berlandierii* originate deeply within the tissue and split their way to the surface. *E. melanocentrus* is still producing scattered flowers in September. They are lovely with ruffled dark pink petals the blossoms often as large as the small plants.

Question: I have a Magnolia Epiphyllum which had many buds but when most of them were about ready to open the flowering stems became soft and the blossoms wilted instead of opening. Mrs. R. D. Nugen, Washington.

Answer: Epiphyllums flower on the last seasons growth or older stems. These stems during the summer store up food and when well matured are plump and heavy. Your plant apparently did well during the past summer and at the proper spring season the buds swelled and started to grow. However, during the winter or spring the plant lost its feeding roots, due probably to too much water or too poor drainage. Therefore the buds had to depend upon the small store of water in the leaves. The food was there, but the water was lacking in sufficient quantity. Perhaps by washing off the roots and trimming the dead portions, then repotting in a quite sandy compost (2 parts sand; 1 part coarse leafmold) your plant may reestablish itself this summer. If it is rotted at the base you can save it by making cuttings far enough above the rotted parts to be clean.

WHO MANUFACTURERS YUCCA CLOTH?

I have often wondered if you ever got any response to your little inquiry notice in the Jan.-Feb. '51 issue viz. a list of cactus products and where to obtain them.

The other day we saw a tablecloth and napkin set, decorated, embellished with a tag stating "Made from Genuine Yucca." We were unable to find out where this article is made or who sells it. We thought surely you would have some response to your little note in the Jan.-Feb. issue. If you can give us any information at all at this time we would appreciate it very much.

RUSSELL H. BLINK,
The Cactus Shop,
Las Vegas, Nev.

From W. S. Wilson, England

Can you imagine the conditions here in Manchester for cactus growing? We are about 1½ miles from Trafford Park, a big industrial area, and the grime that comes down on glasshouses and frames has to be seen to be believed. It is damp and we get fogs and mist during the winter with snow and frost. In spite of all this we are quite pleased with the way our cacti and succulents grow and flower. My Zygocactus flowered late Jan. and Feb. and at that time there were buds on Rebutias, Chamaecereus, Aporocactus, *Echinopsis tubiflora,* most of the Mammillarias. Last year *Opuntia salmaniana* in a 5-inch pot had 65 flowers which set fruit. Nearly all succulents flower except *Echeveria multicaulis* and *Crassula tetragona.*

SPINE CHATS

LADISLAUS CUTAK

If you were fortunate enough to be present at the fourth biennial gathering of cactophiles in Denver recently, then you can claim a new title—that of THE BRETHREN OF THE BANDAGED THUMB. Yep, that's the name given to us by Jack Gaskie, Rocky Mountain News writer. And what a convention it was! Food, entertainment, pictures galore! You never saw the like of it. I know, for I've attended all four conventions to date. The Denver gals worked like mad to put everything in shape. If Julia Willis, Liz Eckstein and Muriel Colburn aren't now nervous wrecks then Coloradoans are made of better stuff than I at first thought. Of course, there were other ladies who did their share, such as the Mrs. Hollingsworth, Risley and Rutschman. Mustn't forget the husbands either, for they helped immensely too.

Gus Bantel and I were the first to arrive in Denver, as I wanted to get "the feel of the place" before the convention officially opened. Julia and Melvin Willis met us at the railroad station, whisked our baggage to a lodge, and then drove out to the Red Rocks Mountain Park where the final portion of the program was scheduled. After lunch we were taken on a sightseeing trip through Virginia Canyon to Central City, where the first important gold discovery in Colorado was made in 1859. Ginger-bread frame houses dot the mine-scarred hills and lend enchantment to the rugged scenery. Wild flowers vie with old fashioned hollyhocks, roses and geraniums in the crowded yards. Throngs filled the narrow crooked streets, taking part in the annual Festival—the 20th since the revival of the little town in 1932.

The Monday prior to the opening of the cactus sessions was spent in gathering such paraphernalia which was to be used in the initiation ceremonies. Muriel Colburn helped out a lot in this. Knowing how nicely the fun session was accepted in Phoenix we planned for better and funnier stunts. Cactus nuts! Yep, that's us!

Tuesday was registration day. Many old faces were seen and new acquaintances made. John Rodgers still sports a heavy mustache with more white hairs showing. Clyde Gaylord will never be forgotten with his silk shirt, sequin-studded tie and long wavy white hair which becomes unruly on damp days. (Yes, it rained intermittently on the three convention days.) Howard Gates, noted for his loud shirts, displays a new creation by Pat Moorten. Even staid Bill Marshall sported a colorful garment and I noticed that many other members were decorated with cactus motifs. All of us were glad to see the very democratic Dr. Elzada Clover, who brought along two nuns that endeared themselves as bona-fide cactus nuts. Sister Marie Fidelis gave a brilliant discourse on cactus and the microscope and opened a new field of study with which most of us are not acquainted. I know Sister will receive lots of cooperation from many of our members in her research work.

Among newer friends attending the convention for the first time was Carl Henscheid of Idaho. He showed some very remarkable kodaslides. Everyone was so intrigued that all voiced to move to Idaho and learn his secret. Henscheid claims he holds no secret. He winters his plants in a cool basement and next spring the plants are loaded with flowers. No fertilizing, no nothing! Young Harry Johnson and Bob Kilian, commercial cactus growers, are going to send plants to Henscheid for flowering. Henscheid is remarkable in more ways than one. Besides being a good photographer he is the father of eleven children—yes, eleven of the cutest, best behaved boys and girls you ever saw. And all were present at the convention with Mrs. Henscheid. Idaho climate must be wonderful!

One of the busiest men at the meetings was A. Millard Armstrong of Columbus, Ohio. Appointed chief photographer, he was busy with several cameras recording the various doings. If all his movies, kodaslides nad black and whites turn out perfect he'll be hailed a miracle man. Action was so fast at times that it proved nigh impossible to keep film speeds and exposures accurate. We wish you luck, Armstrong and all you other photographers. Hope we can see the results someday.

The hat contest was a riot! Twenty-five of the men were models for the cleverest hats you ever saw. One sported a long *Opuntia arborescens* decorated like a Christmas tree, worn by M. Walter Pesman, author of "Meet the Natives." The funniest hat, composed of Opuntia flop-ears, was modelled by Anthony Barone and he got so many glochids in him and his suit that he had to be dry-cleaned. Mort Spielman was the essence of elephantine gracefulness as he paraded around with a hand mirror. Charlie Cole, Clyde Gaylord and Frank Muchow were too chic for words. In fact, all the models were very fascinatingly bewitching. LIFE magazine really missed its chance when it failed to send a photographer to this ravishing display of cactus hats. Six prizes were awarded. First prize of $25.00 donated by the California Cactus Growers Association went to Miss JoAnn Varone of Denver. For the second best hat Miss Muriel Colburn of Denver received $8.00 worth of plants from Cactus Pete. For the funniest hat Mrs. Cornelia Hunter of Chicago received a beautiful earthenware bowl donated by Fitzpatrick Cactus Gardens of Edinburgh, Texas. The most practical hat, designed by Miss Carol Varone of Denver, meritted a beautiful *Cleistocactus Strausii* from Charles L. Cass of San Diego. The most commercial hat prize went to Mrs. Mabel Rutschman of Denver, who received two Epiphyllums from the Beahm Gardens of Pasadena. Mrs. Ernibelle Ranshaw of Cincinnati designed the most photogenic hat and received an Epiphyllum for her effort, also donated by Beahm Gardens. The judges were Cliff Mann, director of the Colorado School of Floral Design; Berenice Lang, consistent flower show winner in the Denver district; and Harry Johnson, Jr., of Johnson Cactus Gardens.

The initiation rites were a bedlam of laughter and fun. We don't have space to tell you about them here now but perhaps some of the reporters elsewhere will dwell upon this subject. However, I do want to congratulate all the initiates for being such good sports. Those of you who have never attended a convention can't realize what you are missing. Congratulations also to the new king and queen, Mrs. Patricia Moorten of Palm Springs, California, and Gilbert Taylor of Beaver, Oklahoma. May your reign be very successful.

CACTI AND SUCCULENTS—COLLECTORS AND DEALERS

Here is the opportunity of a lifetime

For twenty years we have been collecting, importing, and propagating Cacti and Succulents and selling them wholesale to Florists. We have one of the largest, most interesting, and diversified stocks of Cacti and Succulents to be found in this country.

For many years we have been building up stocks of rare, tropical, and foliage plants and have been selling these to the trade during the last two years. We shall continue in business as wholesale growers and shippers of Tropical and Foliage Plants, Silver Variegated and Green Crassula, Aloes, Gasterias, and Haworthias, in variety.

Due to shortage of trained labor, we are going to dispose of our entire Cacti and Succulent stock, with the exception of varieties above mentioned. Only surplus stock of Aloes, Gasterias, Haworthias, and Crassula will be included in the sale.

Beginning September 29th through October 7th, we shall endeavor to dispose of this entire stock. All items will be priced far below current prices. Come prepared to take the plants away with you. All stock to be sold at Nursery, no shipping, no correspondence. Both wholesale and retail sales will be made. The stock includes many flowering-size Specimen Cacti previously reserved for seed production. Hundreds of thousands of Succulents, including many unusual varieties, rare hybrids, and large specimens suitable for landscape work.

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Above specimens sent postpaid—cash with order. Minimum order—$2.00.

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FRITZ SCHWARZ

Apartado 347 San Luis Potosi, SLP Mexico

AFFILIATE NEWS

LOS ANGELES CACTUS AND SUCCULENT SOCIETY

MRS. ETHEL RUSH, *Correspondent*

The meeting of the Los Angeles Cactus and Succulent Society was held July 8th, in the garden at the home of President and Mrs. Rush, thirty-five members were present. This being the meeting for election of officers, after nominations, by secret ballot the following officers were elected to serve until July 1st, 1952: President, Homer G. Rush; Vice-President, Nickolas Bokarica; Secretary, Mrs. Orva Bokarica; Treasurer, Mrs. Addie Dineen; Trustee for two year, Mrs. Ethel Rush.

After the remaining business of the meeting was disposed of, a very fine talk on some of the South American Opuntias and Melococarpus was given by Mr. John Akers, the Chairman of the Botanical Committee. He also gave an outline of the divisions in the classification of the Family Cactaceae as part of the botanical study work.

Four new members were taken into the club at this meeting.

The August meeting of the Los Angeles Cactus and Succulent Society was held August 5th at the home of Vice-President and Mrs. Bokarica. Our Delegate to the Denver Convention of the Cactus and Succulent Society of America, Inc., Mrs. Florence Cariss, made her report. President Rush appointed a Committee to work on the production of funds to help with the entertainment at the next Convention, to be held in 1953. Mr. Bokarica gave a very fine talk on Mammillarias and illustrated it with plants from his large collection of imported plants in order to show the distinguishing points which separate the different groups.

Mr. Rush then gave a short talk on parallelism, the similarities existing in plants of widely separated genera and families. Five new members joined the Club at this meeting. The Los Angeles Cactus and Succulent Society is always happy to welcome visitors at any of their meetings whether or not they may care to become members.

NOW IN STOCK

CACTI by J. Borg—First published in 1937 Professor Borg's book has proved a most valuable work for the keen amateur with its clear, non-technical descriptions of a very large number of species. That so important and helpful a book should have been out of print for a number of years means that many keen growers have been deprived of the assistance it can give. This new edition will therefore be warmly welcomed, and all the more when it is realized that, though the author himself died in 1945, he had left the completed manuscript for a second edition in which are included another three hundred or more species and thirty-six additional illustrations.

Professor Borg was not only an experienced botanist, but also had a very fine collection of Cacti at his home in Malta, and the value of this book, both for its scientific aspect and its cultural directions, will be considerable. 488 pages, 128 photos. Cloth bound, $6.50 postpaid in U. S. A.; foreign, 35c. Please add sales tax in California.

Abbey Garden Press, 132 W. Union St., Pasadena, Calif.